4 9168

PHYSICS ABSTRACTS

BEING

SCIENCE ABSTRACTS—SECTION A

46
43

VOL. 46
1943

EDITED AND ISSUED BY
THE INSTITUTION OF ELECTRICAL ENGINEERS
SAVOY PLACE, VICTORIA EMBANKMENT, LONDON, W.C.2

IN ASSOCIATION WITH
THE PHYSICAL SOCIETY
THE AMERICAN PHYSICAL SOCIETY
THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

EASTMAN KODAK CO.
RESEARCH LIBRARY
KODAK PARK

CONTENTS

Page
List of Journals iii
List of Abstractors vi
Note on the Universal Decimal Classification vii
Abridged Tables of Sections 51, 52, 53 vii
Abstracts:
- 016 Bibliography 153
- 16 Logic 81, 153
- 31 Statistics 105
  - 358.4 Military air service 225
- 389 Standardization 81
- 51 Mathematics 1, 29, 45, 65, 81, 105, 129, 153, 177, 193, 209, 225
- 52 Astronomy. Geodesy 1, 29, 46, 65, 82, 106, 129, 154, 177, 193, 210, 226
- 53 Physics: General 3, 30, 49, 65, 83, 108, 131, 155, 180, 194, 212, 228
  - 531 Mechanics 4, 31, 50, 66, 83, 108, 131, 155, 180, 194, 213, 228
  - 532 Liquids. Hydrostatics. Hydrodynamics 5, 31, 50, 67, 84, 109, 132, 156, 180, 194, 213, 229
    - 532.13 Viscosity 156, 180, 194, 213, 229
    - 532.6 Surface tension 6, 31, 51, 67, 84, 110, 132, 157, 181, 194, 214, 230
    - 532.7 Solutions. Osmosis 6, 32, 68, 85, 111, 132, 157, 181, 195, 214, 230
  - 533 Gases. Aerodynamics 7, 32, 52, 68, 85, 112, 133, 158, 182, 195, 214, 230
    - 533.7 Kinetic theory 182, 196
  - 534 Sound. Vibrations 7, 32, 52, 68, 85, 112, 133, 159, 182, 196, 214, 230
  - 535 Optics 7, 32, 53, 69, 86, 113, 134, 159, 182, 196, 215, 232
    - 535.24 Photometry 8, 32, 53, 69, 86, 113, 134, 159, 196, 232
    - 535.3 Reflection. Refraction 8, 33, 53, 69, 86, 113, 134, 160, 182, 196, 215, 233
      - 535.33 Spectra 8, 33, 53, 69, 86, 114, 135, 161, 182, 196, 216, 233
      - 535.34 Absorption 9, 54, 70, 87, 114, 136, 161, 183, 196, 216, 234
      - 535.37 Luminescence 9, 54, 70, 87, 115, 137, 162, 183, 197, 216, 234
    - 535.4 Interference. Diffraction 11, 33, 55, 88, 116, 137, 183, 197, 216, 235
    - 535.5 Polarization 12, 55, 88, 116, 137, 162, 183, 235
    - 535.6 Colour 12, 33, 55, 71, 88, 117, 137, 163, 197, 216, 235
    - 535.7 Vision 13, 33, 55, 89, 117, 137, 163, 183, 197, 216, 236
    - 535.8 Instruments 13, 89, 118, 138, 163, 216, 236
  - 536 Heat 13, 33, 56, 71, 89, 118, 138, 163, 184, 198, 217, 236
    - 536.7 Thermodynamics 14, 34, 57, 72, 91, 119, 139, 164, 184, 217, 237
  - 537 Electricity 14, 34, 57, 72, 91, 119, 139, 164, 185, 199, 217, 237
    - 537.5 Electric discharge 238
      - 537.531 X-rays 16, 35, 58, 73, 120, 140, 185, 199, 238
      - 537.533 Cathode rays. Electron emission 16, 35, 59, 73, 92, 121, 140, 165, 185, 217, 238
      - 537.534 Positive rays 17, 35, 73, 92, 141, 165, 185
      - 537.56 Ionization of gases 218
      - 537.591 Cosmic rays 17, 35, 59, 73, 92, 141, 165, 185, 199, 239
    - 537.7 Electrical measurements 92, 121
  - 538 Magnetism. Electromagnetism 17, 36, 60, 73, 93, 121, 141, 165, 186, 200, 218, 239
    - 538.56 Electromagnetic oscillations 200, 218, 239
    - 538.6 Effects on magnetic fields. Effects of magnetic fields 36, 60, 73, 93, 121, 141, 186, 201, 239
    - 538.7 Terrestrial magnetism (Physics) 142, 166, 218
  - 539 Molecules and atoms 18, 36, 60, 73, 93, 121, 142, 166, 186, 201, 218, 239
    - 539.16 Radioactivity 19, 36, 60, 73, 94, 122, 143, 167, 186, 201, 218, 240
    - 539.17 Atomic disintegration 20
    - 539.185 Neutrons 95, 122, 143, 186, 240
    - 539.2 Molecular systems 20, 37, 61, 74, 95, 122, 143, 167, 187, 202, 219
    - 539.26 X-ray examination 22, 37, 62, 74, 96, 123, 169, 187, 202, 219, 241
    - 539.3/.4 Elasticity. Strength 22, 37, 62, 74, 96, 123, 143, 169, 187, 202, 219, 241
    - 539.5 Deformability. Ductility. Hardness 23, 37, 63, 97, 144, 188, 242
    - 539.501 Rheology 124, 144, 187, 203, 220, 242
    - 539.6 Friction 24, 75, 97, 145, 220
- 541 Physical chemistry 24, 38, 63, 76, 97, 124, 145, 170, 188, 204, 220, 242
- 548 Crystallography 28, 39, 64, 79, 102, 127, 151, 173, 191, 207, 223, 246
- 55 Geophysics 28, 40, 64, 80, 102, 128, 151, 174, 191, 207, 223, 247
  - 550.38 Terrestrial magnetism (Geophysics) 40, 64, 102, 128, 151, 174, 207, 223
  - 551.5 Meteorology 28, 41, 64, 80, 103, 128, 152, 175, 191, 208, 224, 247
- 552 Petrology 152
- 553 Economic geology 64, 176, 224
- 57 Biology 28, 80, 104, 128, 152, 208
  - 577.3 Biophysics 44
- 58 Botany 80, 128, 208
- 591 Animal biology 80, 104, 128, 152, 192, 208, 224, 248
  - 591.12 Respiration 28
  - 591.17 Animal flight 64
- 61 Medical science 104, 128, 152
  - 611.8 Nervous system 176
- 612 Physiology 64, 192, 208, 224, 248
  - 614.7 Hygiene 248
- 615 Therapy 128
  - 615.9 Toxicology 249
- 616 Pathology 224
  - 621.34 Electric drives 104
  - 621.78 Heat treatment of metals 28
- 622 Mining 152
  - 623.4 Weapons 249
- 63 Agriculture 44, 80, 152, 224
- 632 Insect pests 128
- 66 Industrial chemistry 249
  - 661.713 Cellulose 44, 64, 176
  - 663.632.4 Water softening 192
- 666 Glass 28, 44, 64, 128, 152, 208, 249
  - 666.97 Concrete 64
- 667 Dyeing 64, 104, 249
- 669 Metallurgy 28, 64, 80, 104, 128, 152, 176, 192, 208, 224, 249
- .674 Wood 64, 192, 208
- 675 Leather 249
- 676 Paper 44, 104, 176, 208, 249
- 677 Textiles 28, 44, 64, 80, 128, 152, 176, 192, 224, 249
- 678 Rubber 44, 64, 80, 128, 152, 176, 249
  - 679.5 Plastics 44, 64, 80, 104, 152, 176, 192, 208, 224, 249
  - 681.14 Calculating machines 28
  - 681.4 Optical instruments 128
  - 681.8 Musical instrument making 176
- 72 Architecture 249
- 75 Painting 80
- 77 Photography 28, 64, 80, 104, 128, 152, 176, 192, 208, 224, 249
  - 786 Keyboard instruments 249
  - 788 Wind instruments 192
  - 797.5 Gliding 192

Author Index 229
Subject Index 258

ERRATA

Abstr. 899, line 2; *for* Bondi, *read* Biondi.
Abstr. 1194, line 1; *for* 539.531 : 539.016.3 : 620.1, *read* 539.531 : 539.4.016.3 : 620.1
Abstr. 1268, line 9; *for* seasonable, *read* seasonal.
Abstr. 1508, line 3; *for* Novotny, *read* Nowotny.
Abstr. 2149, line 1; *for* 532.133 : 532.79 *read* 532.133 : 532.77
Page 93, line 37, col. 2; *for* 539.016.3 : 620.1 : 539.531, *read* 539.4.016.3 : 620.1 : 539.531

ACCESSION No. B576

SUBJECT INDEX V. 46

MATHEMATICS

Aggregates
  Theory 519.5
    intersecting continua 1311, continuum and its boundary 1312, compact boundaries 1313, symmetric differences 1566, metric spaces 2292
Analysis
  Combinatory 519.1
    block design 531, quantification 1302
  Statistics 519.2
    tractrix and cycloid distribution 533, physical-chemical data 992, counter interval selector 993, educational statistics 1841, t test 1842, statistical quality control 2288, trend analyser 2475, quality control 2665
Area
  Infinitesimal geometry 513.73
    geom. mean dist. of areas 2102
Bessel functions
  Series 517.512.4
    reversion of series for zeros 790, J_μ, λ process 2468, abs. summability 2469
  Theory 517.564.3
    inversion formulae 332, formulae 791, roots of $J_n'(x)N_n'(kx) - J_n'(kx)N_n'(x) = 0$ 2470, inf. integrals 2471, 2658, expansion 2655, tables 2656, 2657
Calculation
  Methods 518 *see also* Graphs; Nomography
    summation machine 8, multi-harmonograph 833, mechanical synthesizer 991, aerial field pattern 1564, integrator for gravimetric prospecting 1815, integration by printing machine 1836, Poisson's equation 2473, solution by punched cards 2662
Calculus *see also* Operators
  Integral 517.3
    Hermittians 783, Cesàro totalization 984

Complexes
Geometry 513.712/.715
web theory 323
Conformal representation 517.54
mapping theorems 1558
Congruences
Arithmetic 511.22
congruence theorems 517
Connexes 513.72
number of terms 3, appl. to theory of form 786
Constructions
Geometry 513.49
dividers and std. gauge 983, curves of constant width 2650
Contingency
Statistics 519.264
tables 336
Correlation 519.272
significance tests 16, correlation surfaces 994, testing methods 1304, random distances in rectangle 2110, correlation function 2666
Curvature
Infinitesimal geometry 513.73
limit theorem 6
Curves
Algebraic
Plane 513.61
unravelment of ternary quartic 523, parabolic points 784
Skew 523.63
postulation of multiple curve 5, meromorphic curves 524
Determinants 512.83
monomial expansion 1831
Dirichlet's principle
Mathematics 517.544
pseudo-Euclidian invariant 788, 789
Equations
Differential 517.9 *see also* Potential; Oscillations
third-order 12, Lamé sol. by Legendre functions 13, hypergeometric polynomial 333, meson waves 334, conduction in a wedge 864, factorization method 987, analytical solution 988, ultracentrifuge equation 989, Riesz's integrals 1297, periodic solutions 1298, 2661, $y^{\text{iv}} = Ay'''^2 + By''' + C$ 1559, geometric interpretation 1560, superposition theorem 1561, integration by printing machine 1836, recurrent formulae 1837, hypergeometric 1838, formulae 2105, loaded membrane 2106, analytic coefficients 2107, forced oscillations 2472, Poisson's 2473, Sonine polynomials 2652
First and second degree 512.2
iterative solution 2463
Integral 517.948
Hermittian operator 783, numerical sol. 1839
Theory 512.3/.4
multiharmonograph 833, mechanical synthesizer 991, imaginary roots 1830, separation of roots 2647, hypernom 2648
Fields
Theory 519.4
structure theorems 536, last-residue-class 537, ideals assoc. with algebraic varieties 793, Cayley–Dickson algebra 981, artificial 2113, correlation function 2666
Finite differences 517.949
neuron networks 1840
Forms
Algebraic 512.88/.89
number of terms 3, product of 3 linear forms 782, appl. to integral equations 783, *k*-connexes 786
Arithmetical 511.4
lattice points 1827, Waring's problem 2462
Fourier series 517.512.2
summation machine 8, crystal-structure determination 451, jump of a function 527, orbits in magnetic-dipole field 528, discontinuity method 985, numerical analysis 2653
Fractions
Continued 511.7
Vinogradow numbers 1828
Rational 512.5
factorials and interpolation 1288
Functions
Theory 517.5/.8
inequalities 325, quadratic convolution equations 326, coeff. of schlicht functions 327, monotonic Cantor-type 328, inverse functions 986, mechanical synthesizer, 991, inf. order 1295, lower order and exp. of convergence of zeros 1296, Sonine polynomials 2652
Gamma functions 517.61
formulae 2105
Geodesics
infinitesimal geometry 513.735
isotropic manifolds 1291, appl. in relativity 2141
Geometry
Analytical 516
moving axes 982, mixed-solvent extraction 2285
Kinematic 513.738
inverse problem of dynamics 525
Non-Euclidian 513.81
dividers and std. gauge 983
Graphs 518.4
Saqqara graph 15, 530, logarithmic 1563, chem. equilibria 2028, std. curves 2108, correlation of rate data 2287, hypernom 2648
Groups
Theory 519.4
automorphisms 337, 1309, 1848, permutation groups 535, naturalities 1306, subgroups of small index 1307, ordered groups 1308, 2477, photo-elastic coeff. of crystals 1803, normal co-ordinates, 1845, symmetric point groups 1846, symmetric group of deg. 8 1847, cont. a prime nbr. of subgroups 2111, rel. betw. homology and homotopy groups 2112, appl. to isomerism 2291, containing 4 subgroups 2476
Harmonics
Spherical 517.564.4
appl. to Lamé equation 13
Homography 513.761
projective geometry of linear spaces 1292, invariance theorem 1556
Indeterminate equations
Higher degree 511.5
algebraic irrationals 518, reduction formula 519, condition that a C-characteristic be geometric 2283
Integrals
Definite 517.6
Laguerre functions 329, Struve's functions 330, inf. integrals 331, internal cylinder boundary 529, Riesz's integrals 1297, $\int_0^\infty \frac{\tan^{-1}\alpha^2 t^2}{1 + t^2} dt$ 1835, Bessel functions 2471, 2658, radiation integral 2660
Integration 517.3
Stieltje's integral 324, Tchebycheff's inequality 1833, Bernoulli numbers 2651
Laplace transformation
Definite integral 517.63
exponential calculation 11, elastic vibrations 792, network response 2659
Least squares
Mathematics 519.281.2
curve fitting 2646, appl. to eclipsing binaries 2678
Mathematics 51
approach to biology 1555, 2280, disjunction in intuitional logic 1825, form of plants and animals 2281
Matrices 512.831
network problem 520, stress and strain in hyper-space 587, phys. properties of crystals 2062
Means 519.241.5
distr. of harmonic means 335
Measure
Theory 519.53
ergodic theorem 17, measure of plane sets 794, statistical metrics 1310, topologically invariant metric properties 2293
Nomography 518.3
vapour pressure 157, enthalpy/temperature 268, surface-tension/viscosity nomograph 606, diffusion problems 616, applications 990, sp. ht. and viscosity 1299, absorption factor 1300, liquid flow 1356, solidification point of fatty acids 1562, radio noise 2286, wood conductivity 2346, tidal gravity 2474, *P-V-T* rel. 2663

Numbers
  Prime 511.28
    $\sigma_{-1}(n)$ and $\phi(n)$ 1826
  Special 511.9
    Bernoulli numbers 1, demlo-numbers 1285, 1829
  Theory 511.2
    partition formula 516, 1286
Operators
  Differential 517.43
    steady-state currents 787, transient analysis 2163
Oscillations
  Differential equations 517.947.44
    solutions with discontinuous derivatives 14
Polyhedrons 513.34
    min. area 1832
Polynomials 512.3
    moduli of zeros 2, curve fitting 2646, Sonine 2652
Potential
  Differential equation 517.947.42
    electrical integraph 2473, solution by punched cards 2662
Probability 519.2
    definitions 532, partial sums of exp. series 1565, stochastic problems 2109, particle-size distribution 2390
Progressions
  Mathematics 512.12
    inf. sets of numbers 781, progression-free sets 1287
Projection
  Geometric 515
    photographic aid 2104
Quadrics 513.56/.58
    inpolar of rational norm 522, quartic scroll 2464
Quaternions 512.94
    appl. to mol. anisotropy 521, complex spectra 634, 2172, Cayley–Dickson algebra 981, moving axes 982, power-transmission problems 2284, polyadic products 2649
Residues
  Arithmetic 511.2
    2^{p-1} and $(p-1)!$ 2282
Sampling
  Statistics 519.271.3
    distr. of harmonic means 335, appl. in manufacture 1303, ratio of variance 2289
Series *see also* Bessel functions; Fourier series
  Infinite 517.51/.52
    Hausdorff's summability methods 9, reversed power series 10, asymptotic relations 324, convergence test 1834, convergence 2654
Slide rules 518.5
    water alkalinity 1301, reciprocal slide rule 2664, titration calculator 2924
Space
  Functional 513.88
    theory of semi-groups 526
  Infinitesimal geometry 513.737
    imaginary sphere 2466
  Non-Euclidian 513.81
    Finsler space 1293
Statistics *see also* Analysis
  Applications 519.283
    epidemic curve 534, 1305, sunspot cycle characteristics 545, speed of fluctuation 1315, mental-ability tests 1843, corrosion and contact resistance studies 1844
Surfaces
  Algebraic 513.62
    canonical system 785, third-order diff. equation 1560
  Infinitesimal geometry 513.734/.736
    cross-ratio system of 3-web 2465
Tensors 512.9
    meson matrices 1289, appl. to oscillating circuits 1290
Topology 513.83
    lattice of open sets 1294, segments and arcs 2103, inf. linear spaces 2467
Transformations
  Geometric 513.76/.77
    isogonal trajectories 7, unitary affinors 1557
Triangles
  Plane 513.11/.15
    inequality for two triangles 4, lattice points 1827
Variations
  Calculus 519.3
    appl. to biology 2290
Varieties
  Algebraic 513.66/.67
    ideals assoc. with algebraic varieties 793

ASTRONOMY

Astrochemistry 521.04
    chlorine in atmosphere 18, origin of elements 1314
Astronomy 52
    stochastic problems 2109
  Nautical 527
    early history 2579
  Spherical 522.7
    star projector 338
Astrophysics 521.03
    cooling planet 2114
Atmosphere
  Terrestrial 525.7
    night sky brightness 1278, night sky 2685
Binaries 523.842
    white dwarfs, binary, 554, 2123, Σ1669A and Σ1669B 558, theory of relativity 1013, 1014, SX Aurigae, V Puppis, ζ Centauri, RY Scuti, i Bootis B 2127, HD 193576 2128, progress report 2502, HD 203858 2509, 61 Cyg orbit 2680
Catalogues
  Star 523.89
    systematic corrections 1860
Chromosphere 523.752
    correlation with atm. potential 322, flow of matter 341, 1319, cause of aurora 2098, properties rel. to type 2497, progress report 2498
Clusters *see also* Galactic systems; Milky Way
  Stellar 523.85
    Perseus, characteristics 559, Messier 67 560, NGC 2126 and NGC 2194 1858, NGC 5053 and NGC 6838 2503, Perseus cluster 2504, absorption 2505
Comets 523.6
    Oterma 23, progress report 2492
Corona
  Solar 523.755
    coronaviser 546, total light 547, rel. to magnetic storms 1320, photometry 1853, monochromatic photometry 1854, temperature 2117
Corrections
  Astronomy 522.9
    transmission irregularities 20
Cosmic rays
  Astronomy 523.165
    rel. to sunspots and terr. magnetism 795
Cosmogony 523.1
    solar system 540, origin of planets 995, Cepheid theory 1317, non-solar planets 2482
Earth 525
    rel. of magnetism to cosmic rays 795, liquefaction 1010, field variation 2295, stress differences 2296
Eclipses
  Sun 523.78
    eclipse meteorology 480, 1942 Sept. 10 1001, obs. Sept. 41 1316, Delhi field strength 2294
Expeditions
  Astronomical equipment 522.15
    solar eclipse 1941 1316
Galactic systems 523.85 *see also* Milky Way
    cluster structure 34, clusters and long. 35
Gravity
  Measurement 526.7
    temperature control 345, Potsdam abs. value 346, new torsion balance 2510, tidal gravity 2474
Maps
  Drawing 526.98
    sketches from contour maps 2511
Mechanics
  Celestial 521.1
    dynamical friction 1849, 2478, speed of fluctuations 1315
Meteors 523.5
    Pakenham 22, cataclysmic collisions 2483, June 28 (1941) 2484, Stonington, Colorado 2485, Siberian (1908) 2486, Rancho de la Presa 2487, compressive strength 2488, nitrogen compounds 2489, Enon, Ohio 2490, British data 2491, detectors 2671, 267

Milky Way 523.85 *see also* Clusters
Perseus cluster 36, Ophiuchus and N. Sagittarius 563, Cepheid amplitudes 1008, radiation pressure 1323, Cepheus 2129, Cepheid variables 2130, galactic clusters 2131

Moon 523.3
seasonal fluctuation 541, 542, changes 996, crater distribution and origin 2670

Nebulae 523.85
Crab nebula 561, 562, continuum in nebulae 569, nuclear emission 1322, nebulosity near Kepler's Nova 1575, direction of rotation 1859

Novae 523.841.1
nova Cygni 32, Herculis, Serpentis, Pictoris 555, Herculis 1935, Lacertae 1936 1004, material ejected 1005, Nova Cygni 1942 1574, Nova Ophiuchi 1855, HD 15963 2124, Nova Puppis 2125, 2681, spectra 2126, M.W.C. 374 2683

Observations
Astronomical 522.6
photo-electric colorimetry 2667, 2668

Observatories 522.1
Mt. Wilson rep. 1850, Leander McCormick Obs. rep. 1851, R.A.S. progress rep. 2479, occultations, Sydney 2480, occultations, Hyderabad 2481

Occultations 523.99
grazing 37, Cape obs. 2138, Cape and Durban obs. 2139, Sydney obs. 2480, Nizamiah obs. 2481

Orbits
Earth 525.3
orbit variations and climate 975

Parallax
Corrections 522.91
non-solar planets 2482, a paradox 2669
Lunar 523.31
lunar equation 21
Stellar 523.813
Cape of Good Hope Obs. 26, effect of orbital motion 1002

Photosphere 523.741
presence of P 2116

Planets
Description 523.4
Venus atmosphere 543, Jupiter obs. 1774–84 997, chemistry of atmosphere 1820

Precession
Theory 521.92
calculation 19

Spectra
Comets 523.67
presence of CH_2 544, physical theory 1567, emission bands 1568, molecular bands 1569, CH_2 molecules 1570, Cunningham (1940c) 2493, progress rep. 2494
Meteors 523.57
spectrograph study 1318
Stars 523.87
Herculis, Serpentis, Pictoris 555, limb darkening in YZ Cass 556, Σ1669A and Σ1669B 558, Crab nebula 561, 562, 56 Pegasi 564, peculiar stars 565, 2133, 2506, γ Cygni 566, 67 Ophiuchi 567, 568, continuum in nebulae 569, HD 182040 570, α^2 Canum Venaticorum 571, ζ Tauri 572, M-type variables 573, irregular M-type 574, main-sequence stars 575, A dwarfs 576, HD 190073 577, Herculis 1935, Lacertae 1936 1004, novae 1005, colour temperatures 1009, spiral nebulae 1322, 70 Ophiuchi 1324, model atmospheres 1325, BD + 14° 3887 1572, ν Sagittarii 1573, 2508, Nova Cygni 1942 1574, nebulosity near Kepler's nova 1575, *H* and *K* lines 1576, HD 192954 1577, Wolf–Rayet stars 1578, novae 2126, τ Scorpii 2132, HR 8731 2134, Pleione 2135, dwarf M stars 2136, U-Geminorum type 2137, Perseus cluster 2504, 48 Librae 2507, HD 203858 2509, B_8-B_9 stars 2668, Nova Puppis 2681, 6-colour photometry 2682, M.W.C.374 2683, white dwarfs 2684
Sun 523.77
Fraunhofer lines 342, line identification 343, 344, infra-red extension 548, solar *D* lines 549, corona lines, 1936 eclipse 550, coronium lines 551, H^- absorption coeff. 627, CO_2 bands 1571, Hα line shift 2118, α-band of O_2 2119, 2676, Gd lines 2171, dysprosium lines 2499, thorium 2675

Stars 523.8
Greenwich zone 25, O- and early B-type 27, mag./dia. law 28, γ Cas. 29, internal constitution 30, radiation equilibrium 31, completeness of surveys 552, 27 Canis Maj 553, Messier 67 560, obscuration around N. Pole 1003, photography of stars near Sun 1321, Cincinnati 1244 2120, class B stars 2121, 27 Canis Majoris 2122, southern stars 2500, white dwarfs 2684
Variable 523.841
pulsations 33, limb darkening in YZ Cass 556, Algol 557, 1857, M-type variables 573, irregular M-type 574, dimensions and constitution 1006, RV Tauri 1007, S Doradus 1856, U-Geminorum type 2137, radial velocity 2501, α^2 CVen 2667, size, temperature 2677, appl. least squares 2678, effects of reflection 2679

Sun 523.7
structure of atmosphere 24, ion-cloud theory 339, rel. to magnetic and ionosphere disturbances 998, darkening 999, solar activity and radio 2091

Sunspots 523.746
sunspot numbers 340, 1000, 1852, Mt. Wilson data, April, 1942–March, 1943 465, 1258, 2074, 2631, sunspot cycle characteristics 545, rel. to cosmic rays 795, lat. correlation to atm. pressure 2093, progress rep. 2495, systematic fluctuations 2496, infl. on atm. pressure 2641, long-period variations 2674, rel. to radiation 2951

Surveying
Photographic 526.918
stereoscopic projection 38, camera lenses 98

Three-body problem 521.13
generalization of Sundman's equality 538, extension to gravitational gas 539

Tides 525.6
zero point 1579

Universe 523.1
structure 2115

Zodiacal light 523.59
Poona observations 2673

PHYSICS. PHYSICAL CHEMISTRY

Absorption *see also* X-rays
Acoustics 534.83/.84
viscous forces and abs. coeff. 92, "Oelsner" construction 2543, thin walls 2544, factory noise 2748
Light 535.34
visual range under water 114, std. substance 849, $CoSO_4$ and CoS_2O_6 1404, mass coefficients 1691, water vapours and CO_2 1936, K vapour 2326, dyestuffs 2771

Acceleration 531.1
absolute 353, Coriolis theorem 1867

Acids 541.452
acidity scale 312, rel. acid strengths 946, H-bond influence 1789

Acoustics 534 *see also* Waves; Sound
hydrodynamic measurement 93, edge tones 829, propagation in liquids 1593, ultrasonic 1605, 1606, logarithmic recorder 2536, reactance theorem 2729, capillary tubes 2731, wide-angle radiation 2736

Action and reaction 530.15
third law and electrodynamics 1330

Activation
Reaction kinetics 541.124.7
olefinic systems 279, infl. of age and surface 1751, $ZnCl_2$, $ZnBr_2$ and ZnI_2 2249, TlCl 2251

Adsorption 541.183 *see also* Latent heat
cell reactions 304, nitrogen on bone black 308, vapour on cellulose 309, potentials 310, films on solids and on water 612, ascorbic acid 768, binary organic liq. systems 1028, free-energy changes 1108, gases on silver 1233, CO on metals 1234, gas reaction on single-crystal surf. 1235, oxide-coated cathodes 1336, flotation kinetics 1367, sorption-desorption hysteresis 1541, propane and propylene on silica gel 1545, dyes on $NaBrO_3$ 1546, hysteresis 1783, Co ions on TiO_2 1784, surface measurement 1871, hysteresis 2051, indicator dyestuffs 2052, nitrogenous carbons 2246, theory of chromatography 2430, separation of amino acids 2431, riboflavin by lactose 2432, water by glue 2433, NH_3 on clay 2434, N, O, A, H, CO_2 on glass 2517, effect of N on C 2612, ion interchange

Adsorption—*contd.*
  with Zn clays 2619, drying of textiles 2620, chromatography, theory 2621, chromatography, exp. 2622, adsorption isotherm 2715, 2716, mutual coagulation process 2909, water by soap curd 2910
Aerodynamics 533.6 *see also* Flight
  prevention of turbulence 618, pulsating flow 2523, vel. measurement by hot wire 2727, hot-wire anemometer 2728
Alpha rays 539.164
  ammonia decomposition 225, effect on broad-bean root 418, counting 2213, photographic method 2386
Alternating currents
  Theory 538.55
    mech.-elect. analogies 1704
Anode rays 537.534
  intensity asymmetry 1912, 1913, neutron scattering 2217
Arcs
  Electric 537.52
    Hg arc cathode 187, 2825, stabilization 396, stability, l.v. mercury 397, start of a.c. 695, probe investigations 696, physics of arc 1689
Area
  Measurement 531.72
    particle size 238, 239, 357, marking counter 593, oxide-coated cathodes 1336, sacks and bags 1589, adsorption method 1871, air-permeability method 2300, porous glass 2517, crystalline powder 2698
Association
  Liquids 532.74
    aliphatic amines 1368, inversion of methane with trichloroacetic acid 1432, dipole-moment calculations 1496
Atomic rays 539.181
  generation 230, induced colour in crystals 451, induced colour in diamonds 774, photographic recording 897, appl. in spectroscopy 1719, appl. to MgI line structure 1720, H spectrum apparatus 1721, monatomic H 1722, H–H_2 repulsion 1996
Atomic weight 539.155 : 541.23
  sodium chloride 219, packing fractions 220, Amer. Chem. Soc. Rep. 2911
Atoms *see also* Nucleus
  Structure 539.15
    concept of the atom 215, $3d^8 4p$ config. of Co 724, triatomic oxides 1636, neutral WI 1932, body-centred Fe 1988, face-centred Fe 1989, electron capture 2694, Ni and Cu 2847
Attraction
  Universal 531.51
    unitary theory 2514
Autoxidation 541.128.24
  autoxidation in rubber 280, $TiCl_4$ autoxidation 929, ascorbic acid 2417, Cu and Ni with formic acid 2418, developing agents 2896
Balances 531.752
  automatic recording 1339, damping device 1590
Barometers 533.4
  correction formula 2725
Bases 541.454
  steric strain 947, vinyl amines 1239
Bending
  Deformation 539.384
    vibrations 826, elasticity of supports 1731
Bending stresses
  Statics 531.224
    equilibrium of plates 51, built-in beams 52, thin plates 1331
Beta rays 539.165
  radium A 1166
Boiling 536.423
  b.p. of monocyclic hydrocarbons 1099, b.p. and viscosity 2722
Bonds 541.57
  rel. to Raman spectra 128, 648, 1419, *αα*-diphenylethylene 314, propargyl halides 434, vel. of sound 831, C-C in ethene, propane and *n*-butane 950, hydration of organ. mol. 951, proton transfer 1144, $B(CH_3)_2F$ and BCH_3F_2 1146, covalent linkages 1240, COS molecule 1491, polarography of *o*- and *p*-nitrophenols 1535, infl. on acid strength 1789, model 1790, cleavage rule 1791, Raman effect 1941, ortho-substituted phenols and anisoles 1985, donor-acceptor bonding 2258, alkyl and aryl acetylenes 2259
Boyle's law 533.2
  capillary apparatus 2315
Breakdown
  Dielectrics 537.52
    gases 184, theory of initial avalanche 694, gases at h.p. and l.p. 877, insulating crystals 878, theory 1968
Brittleness 539.56
  rubber under stress 2024, steel brittleness 2224, rubber resilience 2882
Brownian movement 530.162
  sensitivity of seismographs 369
  Kinetic theory 533.723
    size of micelles 1902
Buckling
  Statics 531.224.4
    numerical method 53, open-section bars 54, stiffened cylindrical shell 55, rectangular plates 1016, continuous columns 1017, perforated plates in columns 1189, perf. cover plates 1585
Calorimetry 536.6 *see also* Heat; Latent heat; Specific heat
  flow calorimeters 1105, dilute solutions 1897
Capillarity 532.6
  moisture in soil 78, solutions in soil 79, soil studies 80, 1032, moisture in sand 818, oxygen in blood 1597, motion of Hg index 2303, cell division 2306, Poncin's problem 2711, lab. experiments 2858
Catalysis 541.128
  diene syntheses 285, 286, liquid methyl methacrylate 315, hydrolysis in proteins 431, magnetocatalytic effect 432, catalytic hydrogenation 770, urethan formation 931, $NaClO_3$ in weed destruction 932, magnetic substances 1136, charcoal 1206, peroxide decomposition 1207, solvolytic reactions 1208, vapour-phase reduction of nitrobenzene 1209, hydrogenation of cystine 1210, reduction of cholesterol 1211, ammonolysis of 9-phenyl-9-chlorofluorene 1531, ZnO pigments 1598, aliphatic amines 1756, dehydrocholic acid reduction 1757, $KClO_3$ decomposition 1758, *l*-menthone inversion 1759, 1760, recombination of H and OH 1761, effect of gel water 1762, alkylation of halobenzenes 1763, naphthalene oxidation 1764, regeneration 1898, reduction by formic acid 2038, Pd-PVA-V catalysts 2039, fumaric-acid formation 2040, heat transfer 2183, gas/solid interface reactions 2235, reaction rates 2242, hydrogenation rates 2243, oil oxidation 2244, ethylene and CO decomp. 2245, nitrogenous carbons 2246, alcohol dehydrogenation 2413, benzene hydrogenation 2414, kinetics of NH_3 synthesis 2415, *o*-benzoylbenzoic acid in H_2SO_4 2416, photogr. developments 2611, effect of N on C 2612, O and C exchange 2886, hydrogen cyanide hydrolysis 2895, acyl peroxides 2918
Cavitation 532.528
  destructive action 1355, theory 1887
Cells *see also* Concentration cells
  Electrolytic 541.136
    Ag conc. 933, subj. to fields 1220, calomel 2900
Change of state 536.42
  statistical mechanics 50, effect on Raman lines 1418, triple pt. of water 1665
Charge
  Nuclear 539.154.2
    measurement of *h*/*e* 412
Chemical structure 541.6
  rel. to fluorescence 119, substituted ethylenes 435, rubber hydrochloride 966, linear polyamides 1180, additive prop. of hydrocarbons 1241, periodic structure of proteins 1792, *β*-aryl glutaconic acids 1793, $Mo(CN)_8^{-4}$ 2057, cyclohexane 2328, correlation of phys. properties of hydrocarbons 2436, B hydrides 2437, aromatic amines and aliphatic acids 2597, *o*-oxy-carboxylic acids 2623, biphenylene 2912
  Colour relations 541.651
    molar dispersion 1398, aromatic Schiff's bases 1407, resonance in dyes 1644
  Electrical and magnetic relations 541.67
    nickel compounds 111, amino acid polypeptides 179, dipole moment of C-H 212, *α*-nitrotetronic acid 213, urea and thiourea 214, crystalline polymers 682, dielectric const. and loss 1248, aldehydes, nitriles and chlorides 1466, benzyl alcohol 1797, synthetic rubbers 2260, diamagnetic susceptibility 2369

Chemical structure—*contd.*
Magneto-optical relations 541.653
β-levoglucosan 442, xylidinomethylene camphor 443, trihydroxystearic acids 1075, malonic ester 1247, inversion of methane with trichloroacetic acid 1432, K-tetra-oxalato-U IV 1795, starch-iodine complex 1938, benzaldehyde condensates 1944, β-D-altrose 2059, acetic and chloroacetic acids, Se oxychloride 2377, *d*-galactose 2626, 2-halogenopentanes 2784, acryl peroxides 2918, $\alpha\gamma$-dimethylallyl alcohol 2919, *D*-galacturonic acid 2920
Mechanical relations 541.68
rubber 245, rubber elasticity 260, synthetic polymers 261, viscosity 316, keratin fibres 956, viscosities of polyesters 1036, cellulose acetate 1177, keratin structure 1501, high polymers 1548, aq. urea solution 2025, linear polymers 2585
Thermal relations 541.66
phenol-cellulose acetate 955, isomeric phenylphenols and pyridine 1098, b.p. of monocylic hydrocarbons 1099, cyclopentane 1669, benzene and methyl derivatives 2191, halogen-benzenes 2351
Chemistry 54
Newton's philosophy 761, statistical analysis 992, electron microscopy 2230
Analytical 543/545
hydrocarbon analysis 837, mineral powders 844, Cu-Ni impurities 845, detection of H_2BO_3 1061, hydrocarbon mixtures 1550, conductimetric 1769, electrical measurement of moisture 2442, coprecipitation of Ba 2443, Harger test 2924
Inorganic 546
density and m.p. 1021
Organic 547
proteins 392, heat treatment 2561, *Gnetum scandens* 2929
Chromaticity 535.64
composite stimulus tensor 1079, specification of small differences 1435, intensity, hue and saturation 2553
Chromophors 541.651.22
absorption spectra of pyrethrins 643
Circuits
Oscillatory 538.565
characteristics 1484
Theory 538.551
steady-state response 1141
***Cis-trans* isomerism** 541.634
fumaric-acid formation 2040, dibromoethylenes 2625, carotenoids 2914, 1, 3-butadiene 2915, carotenes 2916, gazaniaxanthin 2917
Cloud chamber 539.16.08
collision electrons and mesons 413, demonstration apparatus 414
Colloids 541.18 *see also* Disperse systems; Emulsions; Gels; Sols
glycogen 1227, chromatography of leaf pigments 1436, appl. of electron microscope 1538, size of micelles 1902, paraffin-chain quaternary NH_3 salts 2044, long-chain colloids 2045, aliphatic amines 2255
Coagulation 541.18.046
cell reactions 304, agar-agar 1780, dilution and mutual coagulation 1781, liberation of −SH in proteins 2256
Dispersion 541.18.05
pigment preparation 766, surface-active agents 1599
Osmosis 541.18 : 532.71
osmotic coeff. 2158
Precipitation 541.18.041
AgCl surface in aq. NaCl 1540, hydrous In hydroxide 1778, nucleates 1779, ovalbumin 2050
Thermal properties 541.18 : 536
freezing points 767
Viscosity 541.18 : 532.13
viscosity/conc. 359, viscosity/conc. of cellulose 1346, heat-bodying of tung oil 1595, viscosity const. 1878, stretching factor 1881, 1882
X-ray examination 541.18 : 539.26
particle size by X-ray diffraction 1179
Colorimetry 535.62/.66
photo-electric tristimulus 145, representability on a surface 146, colour solid 147, dyer's system 657, oximeter 658, photo-electric tricolorimeter 1046, Oswald colour system 1076, trichromatic theory 1077, photo-electric tristimulus colorimetry 1078, strips with uniformly varying blackening 1080,

Colorimetry—*contd.*
metric for colour space 2333, composite colour stimulus 2334, haemoglobinometer 2554, colour correction 2778, colour solid 2785, tristimulus specification 2786, trichromatic specifications 2787, O.S.A. Subcommittee Rep. 2788
Colour 535.6
brightness of light sources 144, petroleum products 148, induced colour in crystals 451, pigments in dispersed system 659, darkening of materials 660, decoloration by cathode-rays 708, pigment preparation 766, induced colour in diamonds 774, Colour Council symposium 858, pigmented plastics 1081, small differences 1082, war std. 1433, true colour surface 1434, chromatography of leaf pigments 1436, rel. to particle size 1437, ZnO pigments 1598, colour selector for lighting 1659, colour variation in $Na_4Fe(CN)_6$ and $K_4Fe(Cn)_6$ 2061, petroleum products 2335, blood corpuscles 2789
Colour vision 535.73/.75
trichromatic theory 149, 2337, colour-blind spot 150, colour sense 664, physiology 1660, evolution 2180, physiological theory 2336, symposium 2338, test preparation 2339, tests 2340, colour-blindness 2343, effect of vitamin A 2555, detection of camouflage 2556
Combustion 536.46
ignition of plastics 2352, *p-v-t* changes in explosion 2564, building materials 2565, gaseous explosions 2804
Compensators 535.542.1
plastic wedge 141
Compressibility
Gases 533.2
CH_4 2723
Liquids 532.122
n-octane 61, liquids 1593
Compression
Deformation 539.383
roll on plane 257, 1186
Concentration cells 541.134.4
Ag 933, polarity theory 290
Condensation 536.423
condenser for mixtures 672, electrical detector 867, effect on heat transfer 1087, clouds and dew 2803
Conduction
Electrical 537.311/.312
cuprous oxide 689, steam-condensation effect 867, alumina at high temp. 874, blood 1117, catalyser effect 1468, CO_2 snow 1682, crystals 1683, 2819, metallic films 1684, $PbCrO_4$ 1966, dyestuff phosphors 1967, wool fibres 2358, SnS 2359, thin Pb films 2360, Cu_2O 2818, insulating liquids 2820, $PbCrO_4$ photoconductivity 2823
Heat 536.2
building materials 152, theory 153, heat exchangers 154, internal cylinder boundary 381, 529, plastics 382, abnormality near m.p. 383, lac moulding compounds 668, paramagnetic dielectrics 861, progress review 862, hot-plate method 863, conduction in a wedge 864, terminal corrections 1086, horizontal tubes 1087, hydraulic analogue 1088, tubular exchangers 1089, continuous and non-continuous fins 1090, repulsive action 1091, cooling fins 1092, heat flow analyser 1442, 2-dimensional flow 1664, catalytic convertors 2183, solid particles and fluid 2184, cyl. annulus 2344, warming of walls 2345, nomographs for wood 2346, accommodation coeff. 2347, atmosphere indicator 2348, Lancashire boilers 2796, sliding contacts 2797, heat treatment of metallic strip 2799, electronic apparatus 2800
Conductivity
electrolytes 541.133
alkyl sulphates 289, KBr aq. solutions 934, KCl solutions 1214, morpholine in water 1768, titration 1769, $MgCl_4O_7$ 2043, paraffin-chain quaternary NH_3 salts 2044, long-chain colloids 2045, stannous and stannic complexes 2253, H_2SO_4 in methanol 2421, h.f. measurement 2614
Consistency 539.57
pigments in dispersed system 659
Constants
Physics 53.081
theoretical values 45, probable accuracy 1862, 1863
Contact electricity 537.221
chemical and thermal effects 173, 174, 175, 1464, Cd electrode 1960

- **Corona**
  - **Electric discharge** 537.52
    - point-plane in H_2, N_2 and A 1473
- **Cosmic rays**
  - **Physics** 537.591
    - printometer 201, associated mesons 202, intensity variations 321, obs. betw. N. York and Valparaiso 408, scattering calculations 585, measurement errors 712, non-ionizing component 713, fluctuation 884, cloud-chamber track 885, particle distribution 1131, photo-recorder 1698, ionization in He 1699, Committee Rep. 1972, underground 1973, primary particles 1974, stars at 10 000 ft. 1975, cascade theory 1976, atom-annihilation theory 2202, mesotron mass 2203, orbit stability 2204, meson spin 2205, origin of soft comp. 2206, non-ionizing comp. 2366, absorption 2833, meson theory 2834, barometer effect 2835, electrons in equilibrium 2836
- **Counters** 531.791
  - rapid counter 60
- **Couples**
  - **Theory** 531.221.1
    - wrenches on 2 screws 588
- **Cracks** 539.219.2
  - cracking of ice 1445
- **Creep strength** 539.434
  - tubular creep tests 1193, 100 000 hr. creep test 2021, plasticized polyvinyl chloride 2022, steel, effect of de-oxidation 2405
- **Critical points** 536.44
  - isotherm equation 171, aliphatic hydrocarbons 2709
- **Crushing** 539.383
  - coal 909
- **Crystal optics** 535.52/.58
  - magneto-optical anisotropy 775, demonstration exp. 1074, axial dispersion in crystals 1428, ellipsoidal dispersion in picrate 1429, photo-elastic coeff. 1803
- **Crystallization** 532.78
  - Mg-Mn-Zn-Al 2160
  - **Apparatus** 542.65
    - at low temp. 958, repeated crystallizations 959
- **Crystallography**
  - **Mathematical** 548.1
    - Fourier series technique 452, mathematics of phys. properties 2062
- **Crystals** 548.0
  - crystal and disperse structure 422, physics of diamond 450, surface energy: metal crystals 772, divergent X-rays 904, lattice const., $PbCl_2$ 1551, diamond 1802
  - **Aggregates** 548.2
    - Fe_3C crystal orientation 1249
  - **Electrical properties** 548.0 : 537
    - ultrasonics and X-ray diffraction 90, Rochelle-salt series 164, electric b.d. 878, rectification 1683, vol. rectification 2819
  - **Electron-diffraction examination** 548.74
    - Alkali halide crystals 385, reflections in MgO 401, Al etching patterns 460, $NaBrO_3$ and adsorbed dyes 1546
  - **Growth** 548.5
    - drawn W wire 961, Ag deposit on steel 1251, thermodynamic theory 1997
  - **Magnetic properties** 548.0 : 538
    - magnetic structure 717, magneto-optical anisotropy 775, phase transitions 1143
  - **Mechanical properties** 548.0 : 539.3
    - temp. effect on Rochelle salt 873
  - **Molecular structure** 548.7
    - force const. 1383, amino acids 1805
  - **Optical properties** 548.0 : 535
    - effect of ultrasonics 91, mercury resonance radiations 129, induced colour 451, 774, sulfadiazine 773, thermic effects on X-ray reflection 879, axial dispersion 1428, ellipsoidal dispersion in picrates 1429, photo-elastic coeff. 1803, colour variation in $Na_4Fe(CN)_6$ and $K_4Fe(CN)_6$ 2061
  - **Single** 548.55
    - gas reaction on single-crystal surf. 1235, melting tungsten 1252, scattering of light 1657, self-diffusion 2223
  - **Structure** 548.1
    - β-glycylglycine 960, KCl, KBr, NaBr 1338, C-atoms in martensite 1804, Co transformation 2009, electrodeposited Cr 2444, minium 2627, Si-Fe 2930
- **Crystals**—*contd.*
  - **Thermal properties** 548.0 : 536
    - melting 671, heat capacities 869, thermodynamics 1460
  - **X-ray examination** 548.73 *see also* X-rays
    - technique 251, camera 252, isomorphism and allotropy 454, 2-component glasses 455, oxyhaemoglobin 456, formation of double aggregate 457, diffuse max. 458, ammonium chloride transformation 459, data index 749, photography 904, Ag-Cu alloys 962, data for cubic isomorphs 963, lead chromate 964, diamonds 965, rubber hydrochloride 966, phase change in Fe-Si 967, coal 1109, β-lactoglobulin 1178, diphenyl-benzamide and anisic acid 1253, tarnishing layers 1254, cold-work in metals 1504, 2008, symmetry change with temp. 1806, dynamics 1807, 1808, Gd(OOCH)$_3$ 1809, rolled annealed Al 2007, Co transformation 2009, apparatus 2010, 4 : 4′-dinitrodiphenyl 2063, Dexrae units 2064, thermal scattering 2197, haemoglobin 2200, fibrinogen 2220, reflection from $AuCu_3$ 2363, *p*-iodoaniline-*s*-trinitrobenzene 2448, Pb_3O_4 2449, phthalocyanines and porphins 2450, dissociation of Cu-Fe-N 2628, Be acetate 2933, Na stearate 2934, brass strip 2935
- **Curie point** 538.662.13
  - phase transitions 1143
- **Damping**
  - **Acoustics** 534.37
    - viscous forces and abs. coeff. 92, steam turbines 1906
- **Decantation** 542.66
  - low const. rate 2926
- **Deformation resistance** 539.41
  - bituminous substances 178, plastel 756, plastics 1732
- **Deformations** 539.37/.39
  - soap-bubble model 256, metal structure 754, wood and plywood 755, stretching of rubber 1509, theory 1729, Cu strip 2016, strain distribution 2017, stress birefringence 2783
- **Density**
  - **Liquids** 532.14
    - temperature effect 609, parachors 769, 2056, alkyl compounds 814, α- and β-pinene 1350, cumene 1351, water–*n*-butanol–toluene 1527, nitric and deuteronitric acids 1935, rheochor 2708, aliphatic hydrocarbons 2709, rel. to permittivity 2817
  - **Measurement** 531.75
    - electromagnetic densitometer 57, synthetic rubber 594, selenium 1021, KCl, KBr, NaBr 1338, fatty acids 1399, dry paint pigments 1872, textile fibres 2519, leather 2700
- **Dew point** 536.423.45
  - dew-point indicator 1102, ethane-water system 2802
- **Dichroism** 535.347
  - starch-iodine complex 1938, molecule orientation 2254
- **Dielectrics** 537.226 *see also* Breakdown
  - Rochelle salt series 164, relaxation theory 176, potassium phosphate and arsenate 177, bituminous substances 178, amino acid polypeptides 179, proteins 392, Clausius–Mosotti formula 393, anthracene solutions 647, crystalline polymers 682, electrolytes 683, halides in dioxane 684, absorption capacitor 685, heat conductivity 861, electrolytes 1034, v.p.-electrodynamic vol. 1101, varnish films 1115, synthetic resins 1248, nitroethane and chloronitroparaffins 1465, aldehydes, nitriles and chlorides 1466, water and organic liquids 1677, dispersion in polar liquids 1678, soil 1679, measurement by wave guide 1961, polar liquids 1962, bitumen 1963, space containing electrons 2194, animal fibres 2357, solid insulators 2596, dipole theory 2815, dielecometer 2816, liquids, pressure effort 2817
- **Diffraction** *see also* X-rays
  - **Electrons** 537.533.73
    - orientation 194
  - **Light** 535.42
    - binary liq. mixtures 1425
  - **Sound** 534.26
    - effect of clouds 367
- **Diffusion**
  - **Gases** 535.15
    - thermal diffusion factor 85, flow through porous media 246, 2862, nomographs 616, coeff. of thermal diffusion 820, sep. of mixtures 821, air through monel metal 1603, NH_3 1900, flow meter 2161, in-

46
43

Diffusion—*contd.*
spiration measurement 2313, thermal diffusion 2721, rock samples 2858
Light 535.36
reflection factor 379
Liquids 532.72
nomograph 616, aerosol OT 1369, ovalbumin 1370, Y and Ce salts 1371, soap in salt solutions 1895, theory 2530, free-liquid surfaces 2531
Solids 539.378.3
carbon in Fe-Co alloys 908, Zn monocrystals 2223, C in Fe-Mo and Fe-W 2396
Dilatometry 536.41
recording dilatometer 670, 1096, 2185, extensometer 1095
Dimensions
Physics 53.081.5
dimensions and measurement 40, units and dimensions 41, physical quantities 42, 43, 44, 348, 580
Dipole moment 539.133
bile acids 211, C-H bond 212, α-nitrotetronic acid 213, urea and thiourea 214, mercurous trichloroacetate 295, αα-diphenyl-ethylene 314, Clausius–Mosotti formula 393, halides in dioxane 684, substituted benzenes 721, ammonia 1147, nitroethane and chloronitroparaffins 1465, aldehydes, nitriles and chlorides 1466, organic mixtures 1482, dipole meson 1487, *ms*-tetraphenylporphine 1493, diethyl esters of malonic acids, glyptals 1494, solvent polarization 1496, dispersion in polar liquids 1678, otho-substituted phenols and anisoles 1985, substituted benzoic acids 2211, glycerides 2381, palmitic and aleuritic acid 2382, survey of theory 2815
Discharge
Electric 537.52
varnish films 1115, active N 2826, initiation 2827
Discharge tubes 537.54
velocity-modulation currents 881
Disintegration
Nuclear 539.17
iron isotope 229, recent developments 722, mesotron disintegration curve 735, bromine isomer 1170, As and Ge 1171
Radioactive 539.162
cobalt, zinc and gold 416, manganese 732, successive transformations 894, geochemical U/Pb ratio 895, caesium 1158, Na^{24} 2214, potassium 2385
Disperse systems 541.182
cellulose structure 66, solid crystal systems 305, surface tension 607, diffusion of solubilized dyes 1369, motion picture, latex 1539, diffusion of soap 1895, double refraction 1965, electrophoresis 2361, foam stability 2309
Dispersion
Optics 535.32
dry air 99, silicate glasses 631, crystal rotating device 840, periodically stratified medium 1397, molar dispersion 1398
Dissociation
Electrolytic 541.132
barium bromide 169, metal halides 170, iso-electric point 287, 1766, iodic acid 288, 1213, silver acetate 318, 319, chromic acid baths 433, Debye–Hückel theory 1212, phosphate-chloride mixtures 1216, Ca oxalate 1376, glycine in dioxane-water 1533, KI in SO_2 1602, Grignard reagents 1765, interionic theory 1767, secondary amines 2041, titration of formic acid and acetic acid 2042, substituted phenylarsonic acids 2247, dibasic acids in aq. alcohol 2419, glycine in dioxane-water 2420, effect of NaCl and H_3BO_3 2897, sugar borates 2898
Reaction kinetics 541.124.7
urea 1747, symmetrical inorganic acids 2890, phenoxyacetic acids 2891
Distillation 542.48
reflux regulators 447, manostat 448, nomogram 1300, vacuum fractionation column 1799, molecular still 2923, alcohol in blood 2924
Double refraction
Electrical 537.228.3
dispersed systems 1965
Optics 535.5
experiments 140, swollen fibres 241, starch-iodine complex 1938, swelling of cellulose 1942, 1943
Ductility 539.52
welds in steel 2881
Dynamics 531.3
car-driving 1018
Dynamometers 531.78
Ayrton–Perry type 2704
Eddy currents 538.54
rotating disc 718
Efflux *see also* Nozzles
Liquids 532.525
capillary leak 72, flowmeter 73, flow measurements 601
Elastic limit 539.373
beams bent beyond lim. 1730, failure criteria 2014
Elasticity 539.3 *see also* Strength; Stresses
long-chain molecules 906, brittle coatings for strain measurement 1184, photo-elastic apparatus 1430
Liquids 532.123
tonometer 596, water 597, Berthelot method 2706
Moduli 539.32
props. of glass 752, temp. effect on Rochelle salt 873, beta-quartz, 907, temp. effect on steel 1185, elastic bonded plywood 1726, plastics and plywood 1727, high-density plywood 2221, vinyl elastometers 2222, acoustic method 2589, optical measurements 2866
Theory 539.31
stretching of rubber 168, tesellated stresses 753, 1728, 2015, dislocation theory 1182, large deformations 2013
Electrical precipitation 537.242
gold sol. 1543
Electricity 537
elect. correlates of strains of sweet corn 2356
Theory 537.1
field theory 681
Electrocapillarity 537.361
mercury in acetic acid 693, electrokinetic potential 1122, double layer 1123, capacitance of double layer 1686
Electrochemistry 541.13
Ag conc. cells 933, c.r.o. in polarography 1218
Electrodes
Electrolysis 541.135.5
dropping mercury 292, 293, mineral membranes 294, mercury in acetic acid 693, micro-electrodes for oxygen tension 938, hydroquinhydrone and quinoquinhydrone 1219, cerium amalgam 1536, Ag-AgCl 1772, Cd electrode 1960, polarographic diffusion currents 2252, Donnan equil. 2424, calomel 2900
Electrodynamics 538.3
generalized theory 206, third law and electrodynamics 1330, kinematical relativity and electrodynamics 1483, rational 1702, 1703
Electro-endosmosis 537.362
construction of Tiselius cell 2568
Electrokinematics 537.36
precip. of AgCl 1540
Electrolysis 541.135
fatty acids 291, metal-displacement processes 765, clays as electrolytes 1542
Electromagnetism 538.3
stress tensor 47, moving sphere with surface charge 886, 1978, reciprocity theorem 1138, Maxwell's experiment 2207, equivalent circuits 2839
Electromotive force
Electrolysis 541.134
contact potentials 174, 175, liquid-junction potentials 936, rhenium compounds 937, H overvoltage 939, centrifugal fields 1215, gas electrode chain 1217, thallous-thallic redox potential 1221, chemical and thermal effects 1464, thermodynamics of NaCl solutions 1534, polarography of *o*- and *p*-nitrophenols 1535, Hg-Br electrode 1770, cerous-ceric perchlorates 1771, over-voltage 2048, 2250, 2423, KBr 2248, $ZnCl_2$, $ZnBr_2$ and ZnI_2 2249, TlCl 2251, Pd in HCl and $HClO_4$ 2899
Electron optics 537.533.72
wall structure of pleurosigma angulatum 192, axial aberrations 193, β-ray spectrograph 195, MgO crystals 401, surface structures 402, lens fields 702, investigation of heating effects 703, surface examination 738, electrostatic focusing 880, electrostatic lens 1124, exam. of colloidal clay 1544, phase focusing 2569, biphenylene structure 2912

Electrons 537.122
oil-drop measurement 391, radiation loss of fast electrons 1015, meson movement 1463, dipole meson 1487, pseudoscalar meson theory 1488, det. of charge 1676
Radiation 537.533
electrostatic repulsion 197, decoloration of alkali halides 708, dynamics and scattering 1042, photographic action 1128, propyl and butyl chloride, isobutylene and propane 1403, dissociation of butene-1 1477, methyl and ethyl radicals 1696, blackening of photogr. plates 1970, ionization in atom. and mol. oxygen 1971
Secondary radiations 537.533.8
proton production 196, ionization of A and Ne 403, range in Mg 707, condensed Sb-films 1695, burst-production by mesons 2205, low-energy 2570, Cerenkov radiation 2832
Electrophoresis 537.363
2-path cell 1471, pollens causing hay-fever 1472, γ-globulin 1687, rubber latex 1688, colloids 2361
Electrostatics 537.2
rational electrodynamics 1703, fibres 1959
Emulsions 541.182.4
polarization 132, transparency 2332
Energy
Electro-magnetic 538.312
flow postulate 1140
Radiation 535.23
equilibrium in stars 30, red giant stars 31, black-body 1391, cavity radiator 1617, canal rays 1912, 1913
Entropy 536.75
turbines 680, liquid N_2^{14} and N_2^{15} 866, pure iron at low temp. 868, fundamental concept 872, definition 1113, theory 1114, phosphate-chloride mixtures 1216, isomeric ketones 1457, cyclopentane 1669, Mg_2SiO_4 and $MgSiO_2$ 1670, equil. betw. elementary particles 1674, irrevers. processes 2193, theory of rubber 2879
Equations of state
Heat 536.71
gases at h.p. 679, partition function of gas 764, rubber 870, hydrocarbons 871, synthetic rubbers 1461, theory of liquid state 1958, nomograph 2663
Equilibrium
Chemical
Binary systems 541.123.2
methane-isobutane, 270, approximation at high dilution 271, alcohol-water 272, hydrocarbons 273, partial pressure 274, methane-water 763, 1521, partition function of gas 764, hydration of organ. mol. 951, slide rule 1301, α- and β-pinene 1350, organic solvents 1522, mixture gaps 1523, HCl-*n*-butane 1524, ethanol-water 1525, alumina-water 1526, statistical mechanics 1583, methylcyclopentane-benzene 1739, amino acids and formaldehyde 1740, theory 1893, dimethylaniline-SO_2 2026, histidine and formaldehyde 2232, aromatic amines and aliphatic acids 2597, Fe-Sn 2598, Al-Zn 2599, ethanol-water 2600, ethylene-dichloride–toluene and ethanol-water 2601, $AgNO_3$-H_2O 2719, dew-point gas in ethane-water 2802, H-water system containing tritium 2883
Heterogenous system 541.123
hydrocarbons at high temp. 762, sulphates of V 1520, graphical interconversions 2027, 2028, ternary liq. and binary vap.-liq. 2231, analytical method 2285
Homogeneous systems 541.122
solvent effects in association 269, hydrocarbons 871, N_2^{14} and N_2^{15}, NH_3 and ND_3 1100, alloys at low temperature 1197, CH_4 2723
Ternary systems 541.123.3
methanol-ethanol-water 921, simple liquid 922, $NaNO_3$ dioxane-water 1035, ethyl-alcohol–glycerol–CCl_4 1198, water–*n*-butanol–toluene 1527, Sn-SnS 1741, 1742, temperature effect 2233, cyclohexane–methyl-alcohol 2234, arsenate in $MgNH_4PO_4$ and solution 2257, statistical mechanics 2297, 2298, dioxane-ethanol-water 2602, *n*-hexane methylcyclopentane aniline 2884
Liquids 532.2
liquid-level indicator 1024
Exchanges
Chemical statics 541.123.5
Cl exchange 430, CH_3-HBr reactions 925, Ag exchange with AgBr suspensions 927, alkyl iodides and iodide ions 2237, carbonaceous cation exchange 2603, H isotypes with complex salts 2885, O and C exchange 2886
Expansion 536.41
aluminium 155, plastics, temperature effects 156, phase transformation in alloys 203, low-temperature 384, alkali halide crystals 385, anomalies in hydrocarbons 669, bronzes 1093, titanium 1094, theory 1097, fired clay 1443, indium 2350, phthalocyanines and porphins 2450, Cu alloys 2801
Explosions *see* Reactions
Extension
Elasticity 539.382
cellulose, double refr. 1942, 1943
Eye
Optics 535.7
sensitivity 96, anatomy 661, performance 662, retinal receptor 2179
Fatigue
Resistance 539.43
rubber 264, fabrics 757, helical gear 827, crankshafts 916, effect of Zn on steel 917, i.c. engine bearings 918, biaxial stresses 1191, welded joints 1192, rubber-like materials 1384, steel above 300° 1516, plastics 2020, 2593, machine parts 2403, 2873, plywood 2404, damping 2596, effect of nitriding 2874, effect of screw threads 2875, Cu alloys 2876, woods 2877.
Fibrous structure 539.216
swelling and refr. index 240, anisotropy of swelling 241, silver chemical preparation 242, scaliness 423, fibrograph 589, cotton structure 746, X-ray examination 751, theory 901, keratin 1501, 1502, length distribution in wool 1503, wool 1508, textile 1723, refractometer 1926, cellulose, double refr. 1942, 1943, viscose 2003, paper-making 2004, testing 2857
Fields
Electromagnetic 538.3
historical 1139
Electrostatic 537.212
(Mo) effect on vaporization 2195, 2196, effect on conductivity 2822
Magnetic 538.12
pole-piece design 409, orbits in magnetic-dipole field 528, meson movement 1463, theory 1481, orbit stability 2204
Films
Thin *see also* Oiliness
Liquid 532.62
v.p. and electrodynamic vol. 1101, penetration 1890, paucimolecular layer 1891, veratrine alkaloids 2308, adsorption isotherm 2715, 2716
Solid 539.23
optical measurement 247, Ross filter foils 425, cellulose acetate 1177, gold coatings 1334, electrical resistance changes 1684, metallic films 1724, 2583, Al_2O_3 carrier film 1725, friction properties 1738, conversion coatings on metals 2005, thin Pb film conductivity 2360, electron-microscopy 2392, 2584, amylose triacetate 2863, growth on metals 2892
Filtration 542.67
physical properties 449, blood-plasma filter 771, theory 1500, correl. of rate data 2287, cylinder 2441
Flames
Physics 536.46
radiation 159, abnormality of gases 160, effect of water vapour 386, infra-red spectra 637, NO_2 in cool flames 673, stability and structure 1450, dissociation effect 2563
Sensitive 534.413
vortex street 1353
Flight
Aerodynamics 533.6
effect of wind on aeroplane path 375, end losses 617, animal flight 619, soaring flight 2263, aircraft development 2726
Floating bodies *see also* Stability
Motion 532.58
heaving and pitching 75, superposition method 604, stability of bed materials 811, wave resistance 812

Flow *see also* Gauges; Pipes
Gases 533.1
gas-flow measurement 1378
Liquids 532.5 *see also* Efflux
turbulence 2304
Fluids *see also* Hydrodynamics
Dynamics 532.5
boundary with bay 600, viscous 809, heat-exchange analogue 1088, flow research 1352, Poncin's problem 2711
Fluorescence 535.37
crystal violet 112, glasses 117, manganese in glass 118, coumarins 119, anthracene solutions 647, electronic measurements 839, porphines spectrum 850, materials 853, effect on germination 854, appl. in mining 855, detection of H_2BO_3 1061, phenylated anthracenes 1062, paints 1414, notation 1415, fatigue 1416, quenching by NO 1651, Tl-activated K halide phosphors 1653, fluorimeter 1654, diacetyl 1940, anthracene 2173, applications 2329, chlorophyll 2615, organic molecules 2776, effect of O on hydrocarbons 2777, colour correction 2778
Flux
Luminous 535.241
distribution curve 95, rectangular sources 373, calculation 1619
Foam formation 532.694.1
measurements 2156, stability 2309
Forces
Intermolecular 539.6
sliding metals 1737
Measurement 531.78
tip-force and current measurement 1340
Fracture 539.211
glass-melting pots 2854
Freezing 536.421.4
cracking of ice 1445
Frequency
Acoustics
Measurement 534.63
frequency response recorder 1039, c.r.o. method 2318, 2744
Fresnel zones 535.412
Fizeau bands 1068, limit of resolution 1655, nonlocalizer fringes 2781
Friction
Molecular systems 539.62
mechanism 267, seizure 919, drilling machines 1195, theory 1196, metal films 1724, 1737, 1738, 2583, urea solution 2025, static-friction testing 2407, frictional wear 2408, internal 2595, crank-shaft vibrations 2596
Fusion 536.421.1
selenium 1021
Gamma rays 539.166
beryllium decay 226, nuclear photo-effect 227, effect on broad-bean root 418, Na^{24} 734, Sc^{46} 1167, coincidences 1168, magnetic spectrograph examination 1169, Compton electrons 1718, 2216, light elements 1992, nuclear energy levels 1993, γ-ray radiography 1994, Hg isotopes 1995, disintegration of Na^{24} 2214, rays from Na^{24} and La^{140} 2215
Gauges 531.71 *see also* Pressure
electromagnetic apparatus 356, photometric method 371, fibrograph 589, wool-fibre dia. 590, P.G. comparometer 591, wear gauge 592, precision tools 807, gold coatings 1334, sphericity of sand grains 1335, fibre length 1503, lattice const., $PbCl_2$ 1551, std. wavelength 1588, collimator 1661, electric 1870, size of micelles 1902, glass 2144, minium crystals 2627, capacitance method 2697
Flow 532.57
float-type flowmeter 603, Venturi meters 2305, small const. rate 2524, pneumatic 2705
Gels 541.182.5
rubber photogel 306, wood-water 307, viscosity and structure 360, ductility of cellulose 421, mol.-size distribution 1232, sorption-desorption hysteresis 1541, adsorption of propane and propylene 1545, formation 1782, theory of dissolution 2429, opacity changes 2552, alumina hydrogel 2907, vinyl-divinyl copolymers 2908
Glass
Optical 535.81
transmission 1057, annealing of glass 1190, spectrophotometry 1920, 2755, infl. of iron oxides 1921, recent materials 2557, plastics 2558, reflectance reduction 2793
Glass—*contd.*
Graininess 539.215
photographic plates 900, photographic prints 2391
Granular structure 539.215
sphericity of sand grains 1335, compaction of sands 2000, sintered metals 2001
Gratings
Diffraction 535.421
fabricated steel 650, stigmatic 651, curvature of spectral lines 652, concave 1069, orders and ghosts 1656, demonstration apparatus 2177
Gyroscopes 531.383
bore-hole survey 805
Hall effect 538.632
NbH and NbN 395, cuprous oxide 689, 2818, selenium 720, Al-Ag alloys 1705
Hardness 539.53
hardness of alloys 266, abrasion resistance testing 428, gloss-lowering testing 429, wear gauge 592, diamond impr. on glass 760, heat-treatment criterion 1194, diamonds 1736, testing methods 2229
Hearing 534.75
air and bone conduction 623, subjective tones 624, analysis 835, bone conduction threshold 2166, inner ear 2541, oscillations of the ear 2746, threshold audiogram 2747
Heat 536 *see also* Latent heat; Specific heat
endurance of glass 514, X-ray reflection 879, density and refr. index 1351, stretching of rubber 1509, effect on lens systems 2320, influence on horse serum albumin 2561
Measurement 536.62 *see also* Calorimetry
cooling and drying capacity 1106
Heat of combustion 536.662
compounds cont. peptide bond 1110, rel. to bond energy 1111, ethyl methyl ketone and ethylene oxide 1459
Heat of reaction 536.66
organic reactions 167, digestion of β-lactoglobulin 1112, phosphate-chloride mixtures 1216, petrol-air mixtures 1672, hypoiodite decomposition 1746, dissociation 1956, Mn_3O_4 and MnO_2 formation 2190
Humidity 533.275
tables and charts 2316, measurements in presence of salts 2317
Hydrodynamics 532.5 *see also* Waves
conservation theorem 1025, theory 2152
Hydrometry 532.57 *see also* Gauges
pneumatic telemetering 2705
Hygrometry 533.275
pump calibration 1379, recent developments 2724
Hysteresis
Magnetic 538.23
hysteresis loop analysis 1137
Impact 531.66
elastic bars 355, variable masses 1581
Impedance
Acoustics
Measurement 534.64
tube method 834, bridge 2745
Incandescence 536.45
hot gases 158
Inclusions 539.219.1
cordiness in glass 748
Induction
Mutual 538.52
co-axial rings 1979
Instruments 53.083/.089
small-bore capillaries 46, gravity-controlled sight 581, spectrochemical analysis 632, laboratory stand 798, use of Wood's metal 2690
Electrical 537.74
adjustment 1479, limit of measurement 1480
Optical 535.8
collimator 1661, light-and-shadow box 1663
Insulation
Heat 536.212.3
Indian materials 667, medium temperatures 1441, steam-pipe insulation 2560, clothing 2798
Interference
Light 535.41
use in lens manufacture 1424

Ion counters 539.16.08
proportional counters 223, after-effect 224, emanation measurements 415, 1991, monochromatic X-rays 698, measurement errors 712, meson lifetime 727, quenching gas effect 728, interval selector 729, coincidence circuit 730, discharge localization 893, interval selector 993, miniature 1152, saturation characteristics 1153, efficiency 1154, centrifugal fields 1155, pulse lengthener 1156, analysis for K 1497, analysis of oil-well samples 1715, pulse size 1990, mica-window 2848, radon 2849, regulating circuit 2850
Ion velocity
  Electrolytic 541.133.1
adjustment of solute conc. 935, aq. KBr solution 2046, measurement 2047, aliphatic amines 2255, laurylsulphonic acid 2422
Ionization 537.56/.58
coeff. free electrons 199, energy loss 200, A and Ne by electron-impact 403, H_2 and D_2 by canal rays 406, ortho- and para-hydrogen 407, measurement of scattering 709, A, N_2, He and H_2 710, free electron mobility in N 711, hydrogen by neutrals 882, deviation from Schottky line 883, electron affinity of Cl 1130, slow K ions 1478, atom. and mol. oxygen 1971, A ions in He 2365, l.v. H ions, scattering 2571, 2572, 2573, 2574, recombination for weak ionization 2575
Isomerism 541.62
crystal violet 112, β-carotene 436, appl. of group theory 2291, simple ring compounds 2438, 2913
Isotopes 539.155.2
supra-conductivity 183, history 221, rel. abundance measurement 222, molybdenum 725, 726, liquid N_2^{14} and N_2^{15} 866, N_2^{14} and N_2^{15}, NH_3 and ND_3 1100, ratio rule 1149, chem. separation 1150, Report 1941 1151, La^{140} 1713, definition 1714, Hg isotopes 1995
Jets 532.525
vortex street 1353, ejector problem 1354
Kerr effect 537.228.4
spontaneous effect 181, voltage fluctuations in resistors 1681
Kinetic theory
  Gases 533.7
friction and damping 86, sep. of mixtures 821, illustr. examples 1381, distance correlations 1901, forces betw. H_2 molecules 2162, hydrocarbons 2355
  Liquids 532.7
water 597, statistical 614, nature of liq. state 615, theory 1893, theory of liquid state 1958, statistical theory 2157, properties of fluids 2528, rel. to engineering 2718
Kirchhoff's laws 537.313
demonstr. of indep. measurement 1326
Laboratory apparatus
  Electrical 542.8
cell unit 1801, a.c. titrometer 2261, electrometric apparatus 2927, controlled syntheses 2928
  General 542
temperature and humidity cabinet 444, dryer 445, micrometer burette 446, flask design 957, laboratory bellows pump 1549, organic microchemistry 1798, const.-level device 1800, m.p. apparatus 2060, flow meter 2161, decomposition kinetics 2921, vapour thermoregulator 2922
Latent heat 536.65
v.p.-lat. ht. relation 166, germanium hydride 388, cyclopentane 1669
  Of adsorption 536.658
nitrogen on bone black 308, isotropic cellulose 389, free-energy changes 1108, properties and structure 1109, influence of fineness of grinding 1955, accomodation coeff. 2347, ethyl chloride and SO_2 2812
  Of solution 536.653
isomeric ketones 1457, influence of fineness of grinding 1955, $LaCl_2$ and $La_2(SO_4)_3$ 2189, ethylene-dichloride-toluene and ethanol-water 2601
  Of vaporization 536.655
measurement by accom. coeff. 677, N_2^{14} and N_2^{15}, NH_3 and ND_3 1100, phenylhydrazine 1448, hexanes 1458, parachor 1671, ref. substance plot 2811
Least action
  Principle 531.314
general variational principle 2290
Lenses
  Geometrical optics 535.316/.317
aeroplane-camera 98, adjustment to cameras 630, Airy disc formula 1049, thermal effects 2320, design 2546, ray tracing 2760
  Optical instruments 535.81
testing instrument 1951
Liquefaction
  Gases 533.24
non-fouling H liquefier 364
Lissajous figures 534.522.5
multiharmonograph 833
Low-temperature effects 536.48
device for visual observation 674, concrete at high altitude 675, liquid-air storage 1954, adiabatic demagnetization 2844
Lubrication
  Theory 532.516
temperature behaviour 2153, static-friction testing 2407, anomalous viscosity 2710
Luminescence 535.37
properties of materials 115, fluorescein 131, freshly burnt gases 649, alkali-halide phosphors 1058, fluorspar 1063, adsorbed dyestuff 1067, fluxes 1412, lucigenin 1413, tetraphenylhydrazine 1537, activators for luminescent materials 1652, molecule orientation 2254, materials 2775, active N_2 2780
Macrography 535.842
recording macrostructures 1439
Magnetization 538.24
structure of Fe crystals 717, ultra-violet radiation 887, relay current transformer 2371, remanence measurements 2838, neutron polarization 2853
Magnetism 538
Rochelle salt series 164, phase transformation in alloys 203, infl. of ultrasonics 716, magneto-optical anisotropy 775, catalytic activity 1136, organic mixtures 1482, rocks 1701, Fe-Ni alloys 1977, solid and powdered magnetites 2367, Cu-Ni alloys 2368
  Terrestrial 538.7
early history 1982, 2579, derivatives of fields 1707
  Theory 538.1
magnetic ion 204, recent theories 205, polycrystalline ferromagnetics 1135, progress rep. 2837
Magnetomechanical effects 538.65
iron electrode potential 719
Magneto-optical effects 538.61
rel. to chem. structure 2377, $NiSO_4$ 2842, H_2O_2 2843
Magnetostriction 538.652
general summary 207, Mg, Ag, and Li 715, optical measurements 1142, photogr. recording 1486
Magnetothermal effects 538.66
adiabatic temp. changes in iron 1706, iron alum 2844
Manometers 531.787
fluid metering 1342, 1877, Barcroft apparatus 1592
Mass spectra 535.336.2
gas analysis 102, analysis 103, rel. abundance measurement 222, mass/distance curve 633, appl. of atomic beams 1719, 1720, H atomic spectrum 1721, mass spectrometer 2169
Matrices
  Quantum theory 530.145.63
particles of higher spin 584, meson scattering 585, configurations *ll's* 802, radiation loss of fast electrons 1015, meson matrices 1289, 1866, electron capture 2694
Maxwell's equations 535.13
enclosed cylindrical spaces 626, Fresnel's formulae 836, complex refr. index 1390
Measurement
  Principles 53.08
philosophy 1011, demonstr. of indep. measurement 1326
Mechanics
  Intramolecular 539.132
appl. of tensor calculus 521, asymmetric rotor 1145, pseudoscalar meson theory 1488, spin in classical approx. 1489, ethylene, butadiene and alkyl derivatives 1648, *l*-type doubling 1708, 1712, linear *X-Y-Z* molecule 1983, meson theory of moments 2210, interaction betw. 3 atoms 2379, Li wave functions 2380, H-water system containing tritium 2883

Melting 536.421
non-polar crystals 671, colloidal electrolytes 767, inhomogeneous compounds 1444, theory 1997, halogen-benzenes 2351
Micrography 535.843
use of hand camera 1440, analytical pattern 1953
Micrometers
  Physics 531.714.7
paper micrometer 2299
Microscopes 535.82
Abbe theory 1084, theory 1085
Microscopy 535.82
wall structure of pleurosigma angulatum 192, appl. in rubber industry 666, fluorescent lamp 1662, development 1950, colour microscopy 2794
Microstructure 539.2
applications 2012
Mineralogy 549
hardness differences 1736
Mirrors
  Geometrical optics 535.312/.313
moving mirror 1581, image formation 1624
Molecular systems 539.2
shape of pebbles 758, high-polymer fibres 1499, thermodynamic theory 1997
Molecular volume 541.25
sulphuric acid 311, parachors 769, 2056, $NiSO_4$ solutions 1238, KCl, KBr, NABr 1338, diffusion of ovalbumin 1370, nucleates 1779, mol-diameters 1787
Molecular weight 541.24
polystyrene 237, 598, proteins 1237, viscosity of chain-polymers 1547, polyisobutylenes 1594, chain molecules 1785, gaseous sulphur 1786, nitrocellulose 2053, cellulose molecules 2054, 2055
Molecules 539.1
folding of selenanthren 208, meson dispersion 209, carbon 210, doubling in OD 410, proton transfer 1144, $B(CH_3)_2F$ and BCH_3F_2 1146, COS molecule 1491, methyl isocyanide 1492, ozone 1495, water and organic liquids 1677, protein 2209, OD structure 2378, rubber 2845, statistical length 2846
Moments *see also* Dipole moment
  Molecular 539.133
vibratory electron 1709, very dilute solutions 2159, magnetic moment 2210
  Nuclear 539.152.2
electric quadrupole moments 411, rigid rotator 723, nuclear spin of Cl^{37} 2769
Monochromators 535.339
water prism 848, astigmatism 1056, cooling of discharge tubes 2770
Motion
  Flexible bodies 531.391
train motion, elect. analogue 806, vehicle suspensions 1019
Neutrons 539.185
scattering in deuterium 231, yield from deuterons 232, inelastic scattering 233, effect on broad-bean root 418, absorption in rare earths 419, effect on biological tissue 420, C neutrons in water 898, ion source with mass-monochromator 1172, effect on chromosomes 1476, cancer treatment 1498, rational electrodynamics 1703, magnetic moment 2210, scattering by protons 2217, photographic method 2386, polarization 2853
Newton's laws 530.15
Newtonian mass 582, Newton's Principia 583
Noise
  Abatement 534.83
transformer noise 370, noise-meter performance 1041, sound insulation 1389, recording 1611, train noise 1908, fine-mech. gear 2542
  Measurement 534.839
apparatus and technique 1041, 1388, 1611
Nozzles
  Efflux 532.525
pulsating flow 2523
Nucleus
  Structure 539.152.1
virtual state of deuteron 48, meson scattering 216, excited states 217, recent developments 722, polarizability of H^- 891, excited spin states 1148, theory 1710, binding energies 1711, strong-coupling meson theory 1986, β-decay 2383, meson field 2580
Oiliness 532.692
films on solids and on water 612, sep. of plates in lubricant 1892
Optics 535
sulfadiazine 773
  Geometrical 535.31
propagation in hollow conductors 1048, rectification of photographs 1623
  Physical 535.2
selective irradiation 1613
Organ pipes 534.115
Haskell type 620
Oscillations
  Electromagnetic 538.56
mass radiator 2576, diode 2840
Osmosis 532.71
wood-water 307, aliphatic amines 1368, diaphragm equilibrium 1894, colloidal electrolytes 2158, KBr aq. solutions 2248
Oxidation
  Electrochemical 541.138.2
formaldehyde 1773, $Fe(CN)_2$–$Fe(CN)_3$ electrodes 2425
Parachor 541.265 *see also* Density
rel. to lat. ht. of vap. 1671, ionic factors 1788, SO_2 addition compounds 2525, rheochor 2708
Particle size 539.215.4 *see also* Colloids
sub-sieve ranges 238, 239, apparatus for analysis 357, crystal and disperse structure 422, 2002, pigments in dispersed system 659, photographic emulsions 1176, filtration theory 1500, effect on heat of solution or wetting 1955, open-pore vol, and particle radius 2051, comminuted system 2390, cenospheres 2856
Periodic system 539.162 : 541.2
element 85 731, element 93 1157, lemniscate grouping 1236, La^{140} 1713, element 87 1716, completion 2581
Permeability
  Magnetic 538.213
permeability values 1133
  Mechanical 539.217
rubber 245, tentative textile std. No. 7 424, air-filter efficiency 902, moulded plastics 903, transparent wrappings 2219, rock samples 2858, flow of printing-ink 2859, paper 2860, soils 2861
***p*H** 541.132.3
acidity scale 312, calomel cell 940, phosphate-chloride mixtures 1216, horse serum albumin 2561, temperature dependence in blood 2613
Phase rule
  Thermodynamics 536.775
Li palmitate and water 1675, γ-globulin 1687
Phosphorescence 535.37
microscopy 116, characteristics, materials 120, decay in alkali halogen and silicate phosphors 852, adsorbed trypaflavine 1059, Zn silicate phosphors 1060, quenching of Cd radiation 1939, conductivity of dyestuff phosphors 1967
Photochemistry 541.14
characteristics of silver bromide 298, darkening of materials 660, Cd-sensitized reaction of olefins 942, Hg-sensitized reactions of ethylene 944, free hydroxyl 1223, methyl iodide oxidation 1224, stability of papers 1225, tetraphenylhydrazine 1537, latent-image formation 1774, solarization 1775, molecule orientation 2254, silver halides by dyes 2428, cellulose 2901, latent images 2905
Photo-elasticity 535.55
photo-elastic analysis 1073, photo-elastic apparatus 1430, glass-strain analysis 2178, plastics 2783
Photolysis 541.144.8
uranyl oxalate photolysis 299, dimethylhydrazine 300, methyl formate 301, riboflavin 302, acetone photolysis 941, propionaldehyde 943, *n*-butyl methyl ketone 1226, gaseous HI 2049, acetaldehyde vapour 2426, acetone-iodine mixtures 2903, *n*-butyl methyl ketone 2904
Photometry 535.24
eye sensitivity 96, colour grading 97, tristimulus colorimetry 145, colorimetry 148, thickness of galv. coatings 371, internat./new c.p. 372, photo-electric densitometer 374, microphotometer 628, reflection meter 629, brightness scale 838, decay curves 839, photronic 1044, stray light 1045, tricolorimeter 1046, light meter 1047, light of night sky 1279, 1280, illumination control 1392, densitometer lamp regu-

Photometry—*contd.*
lation 1393, NO oxidation study 1395, reflex reflectors 1396, std. response curves 1618, assessment of street-lighting 1620, faint light 1621, microdensitometer 1622, fluorimeter 1654, assessment of effectiveness 1914, illumination calculation 1915, transmission and contrast 1916, optical wedges 1917, slotted cylinders 1918, filter photometry1922, solution analysis 1923, general survey 2751, daylight 2752, duple 2753, valve potentiometer 2756, X-ray diffraction 2757, photometer use and maintenance 2758

Photons 535.14
photon statistics 2750

Photosynthesis 541.144.7
radioactive tracers 1164, dichloro- and dibromoethane 1776, Co_2 fixation 1777, chlorophyll oxidation 2427, *N. closterium* 2615, vinyl chloride and B or Cl 2616, *n*-butane composition 2889, flash saturation 2902

Physics 53
Swiss Phys. Soc. report 39, 797, teaching 347, definitions 532, pigments and glasses 578, Amer. Assoc. Physics Teachers Rep. 579, appl. to heating and ventilation 796, 2140, explanation and experience 1012, glycogen, properties 1227, nylon 1580, diamond 1802, synthetic rubber 1861, stochastic problems 2109, correlation of phys. properties of hydrocarbons 2436, properties of dental materials 2512, appl. in chem. industry 2686, 2688, bows and arrows 2687, Northwestern Univ. Lab. 2689, Symon's Mem. Lect. 2946

Principles 530.1
virtual state of deuteron 48, fundamental particles 2142

Piezo-electricity 537.228.1
crystal piezometer 58, plate vibration 180, temperature effect 873, elastic constants 907, std. definitions 1680, properties of quartz 1964

Pipes

Flow in 532.54
optimum velocity 74, critical conditions 602, steam-water flow 810, pressure-drop nomograph 1356, fluidity of cast iron 1357, roughness factors 1888, capillary tube 2303, mathematical theory 2712, vibrations 2730

Vibration 534.1
suction 2534, damping 2730

Pitch

Musical 534.321
pressure variation in flute 2164, piano strings 2737, dissonance and context 2740

Plasticity 539.214
ebonite 236, polystyrene 237, cellulose gels 421, vinyl elastomers 742, soil mechanics 743, 744, 2389, bearing capacity of clay 745, self-recording plastometer 899, 1998, lateral pressure of sand 1999

Pleochroism 535.347/.349
radioactive origin 1411

Polarimetry 535.568
glass testing 656, photo-electric 1945, sugar borates 2898

Polarization

Electrolytic 541.135.6
mercurous trichloroacetate 295, Hg surface pulsations 2714

Light 535.51
effect on neodymium spectrum 110, light scattered in liquids 137, silver sols 1426

Polymerism 541.64
liquid methyl methacrylate 315, drying oils 440, effect of quinone onstyrene 441, size distribution 926, mol. wt. distribution 952, methyl vinyl ketone 953, styrol 954, vinyl chloride and acetate 1245, styrene 1246, 2439, reaction kinetics 1532, 2032, HF and DF 1796, cellulose molecules 2055, kinetics 2411, vinylidene chloride 2440, reaction kinetics 2893, acyl peroxides 2918

Polymorphism 548.33
polymorphy and miscibility 453, CaC_2 1250, As_4O_6 2445, Bi_2O_3 2446, P_2O_5 2447, normal paraffins 2931, MgC_2 2932

Porosity 539.217.1
rubber 243, coal 244, flow through porous media 246, 2862, fibre bundles 747, surface area of glass 2517

Potential

Electrostatic 537.213
biological problems 172

Newtonian 531.26
2-dimensional problems 1586

Theory 530.19
transparency of potential barrier 49

Thermodynamic 536.77
contact p.d. 173, compounds cont. peptide bond 1110, phosphate-chloride mixtures 1216, anhydrous sulphates 1453

Pressure

Measurement 531.78
crystal piezometer 58, modified McLeod gauge 59, electrical analogy 1341, mercury-balance regulator 1875, low-pressure gauge 1876

Osmotic 532.71
calculation 81, biological fluids 819, rubber 1037, polyisobutylenes 1594, polyvinyl chloride 1600, $NaClO_3$ 2529

Radiation 535.214
cosmic dust 1323

Prisms 535.315
error analysis 1625

Projectiles

Motion 531.55/.57
alternative deduction 800, controlling devices 1333, effect of earth's rotation 1587

Projectors

Optics 535.88
illuminographic camera 2795

Protons 537.13
magnetic moment 2210

Radiation 537.534
short-range α-particles from F 405, ionization in H_2 and D_2 406, ortho- and para-hydrogen 407

Quantum theory

Mechanics 530.145
probability and reversibility 351, pseudo-Euclidian invariant 789, spinor invariance 799, elasticity 1182

Molecules 539.132
quantization 888, quantized radicals 889, H^- ion 890, quinoidal state 1490, quantization of diatomic mols. 1984

Nucleus 539.152.1
meson theory 218, 1987, spin inversion 892

Radiation 535.14
H^- absorption coeff. 627, meson theory 2834

Radiation

Heat 536.33
hot-plate method 863, configuration factors 865, reflection 2349

Theory 535.1
non-linear optics 94, 2545, dynamics and scattering 1042, rational electrodynamics 1702, impact of wave packet 1911, integral (tables) 2660

Radioactivity 539.16 *see also* Alpha rays; Beta rays; Disintegration; Gamma rays
radioactive marine rocks 475, He and radioactivity in rocks 971, 2212, regional distr. in Canada 2384

Induced 539.17
cobalt radiations 228, Cr^{49} 736, Na^{22} 2852

Radiometers 535.214.4
alkali alloys 1043, photovoltaic effect in Cl 1614, spectral response 1615, eff. in soft X-ray region 1616

Raman effect 535.375.5
diamond 113, naphthalene 121, aniline 122, diethyl disulphide 123, binary liquid mixtures 124, uranyl compounds125, temperature effect 126, 1,3,5-triphenyl benzene 127, rel. to H bonds 128, 1419, mercury resonance radiations 129, diamond 130, iodic acid 288, 1213, aldehydes and ketones 648, methyl alcohols 851, KHF_2 and HF 856, hydrocarbons 1064, 2174, 2550, depolarization factors 1065, heavy water 1066, sulphur 1417, effect of change of state 1418, acetamide 1420, chloro- and bromo picrin, trichloro acetamide 1421, $AlBr_3$ 1422, structure of $AlCl_3$ and SO_2 compound 1423, hydrocarbon mixtures 1550, nitric and deutero-nitric acids 1935, H-bonds 1941, polyatomic molecules 2175, dichlorobenzenes 2325, survey 2330, detection of carbonyl groups 2551, trideuteronitromethane 2772, cyclobutane 2773, ascorbic and tetronic acids 2779

Rarefaction 533.5
high-vacuum technique 1380

Rational mechanics 531
mech.-elect. analogies 1704
Reaction kinetics 541.124/.127
hydrogen and cyanogen 275, *t*-butyl nitrate and water or NaOH 276, alkaline hydrolysis 277, solid substances 278, olefinic systems 281, copper and iodine 284, allylic rearrangements 923, resonance and reactivity 924, infl. on polymerization 926, acid-catalysed hydrolysis 1199, sintering 1200, 2031, O_2 absorption by glutathione 1202, carbinol formation of phenolphthalein 1203, inversion of methane with trichloroacetic acid 1432, rubber curing 1505, very dilute solutions 1528, vulcanization of rubber 1529, ammonolysis of 9-phenyl–9-chlorofluorene 1531, chain polymerization 1532, hydrazine cyanate→semicarbazide 1743, unimolecular 1744, haemoglobins 1745, hypoiodate decomposition 1746, oxidation by dehydrogenase enzymes 1748, ascorbic acid oxidation 1752, sodium phenylbromoacetate hydrolysis 2029, storage-battery paste 2030, polymerization 2032, gas/solid interface reactions 2235, copolymerization 2411, kinetics of NH_3 synthesis 2415, *o*-benzoylbenzoic acid in H_2SO_4 2416, linear-temp. increase 2604, *n*-butyl bromide reactions 2605, aromatic bromination 2606, hydrocarbon chlorination 2607, reduction of Fe_2O_3 2608, alkali-faded bromophenol blue 2609, diene reaction 2624, dibromo-ethylenes 2625, steam-carbon 2887, thermal decomposition 2888, *n*-butane decomposition 2889, vinyl polymerization 2893
Reaction rates 541.127
copper oxidation 282, oleic acid and oxygen 283, temperature dependence 928, silver oxalate reduction 930, oxidation of triolein monolayers 1201, *p*-toluene sulphonyl chloride with sugar derivatives 1204, $O_3 + Br^- \rightarrow$ 1205, gas reaction on single-crystal surf. 1235, NO oxidation 1395, solution of Mg 1530, ammonium cyanate-urea 1753, saponification 1754, hydrolysis of *d*, *l*-α-bromopropionic acid 1755, Cu oxidation 2033, 2034, Fe oxidation 2035, film formation on metals 2036, tarnishing of metals 2037, symposium 2238, prediction 2239, organic reactions 2240, vapour-phase esterification 2241, solid catalysts 2242, catalytic hydrogenation 2243, water softening 2273, correlation of rate data 2287, formation of orange II alumina 2409, boric acid 2410, H_2O_2 decomposition 2412, transmission coefficient 2610, oxidation 2892, Pb tetra-acetate oxidation 2894
Reactions
Spontaneous 541.126
charcoal and KNO_3 1749, decomposition of KNO_3 1750, H-O reaction 2236, flame temperature 2804
Reduction
Electrochemical 541.138.3
unsaturated hydrocarbons 296, iodate and bromate 297, aromatic polynuclear hydrocarbons 1222, alkyl and aryl acetylenes 2259
Reflection *see also* X-rays
Elastic waves 534.24
sound pulse by parabolic mirror 366, 2nd-order effects 622
Light 535.312/.313
reflection meter 629, periodically stratified medium 1397, reflection in continuously varying media 1608, heat 2349
Refraction
Geometrical optics 535.314
swelling of fibres 240, uneven anistropy 375, conical refraction 1924, geom. constructions 2759
Refractive indices 535.32
alkyl compounds 814, coal 841, 1050, properties and structure 1109, α- and β-pinene 1350, cumene 1351, fatty acids 1399, water–*n*-butanol–toluene 1527, CCl_4-$HC_2H_3O_2$-C_6H_6 1601, nitric and deuteronitric acids 1935, P_2O_5 2447, electrolyte mixtures 2547, H_2O_2 2761
Refractometers 535.322
error sources 1925, fibres 1926
Relative motion 531.18
kinematical theory 1329, variable masses 1581
Relativity 530.12
stress tensor 47, axiomatic relativity 349, 1864, 1865, rotating disc 350, abs. acceleration 353, spinor invariance 799, alternative deduction 800, space problem 801, double stars 1013, 1014, excited spin states 1148, isotropic manifolds 1291, equations of fit 1327, internal solutions 1328, kinematical theory 1329, kinematical relativity and electrodynamics 1483, rational electrodynamics 1702, 1703, null geodesics 2141, radiating star 2513, unitary theory 2514, time concept 2691, 2692
Relaxation
Elastic 539.389.3
damping in steel 259, Mg and Al alloys 912
Resistance
Electrical 537.311/.312
artificial graphite 182, thermal fluctuations 394, telecommunication materials 686, silver alloys 687, contact problem 688, contact welding 690, contact non-linearity 875, wood 876, carborundum resistors 1116, temperature coefficient 1118, effect of magn. field 1120, electron theory 1467, plastic flow and elect. resistance 1518, Al-Ag alloys 1705, polyvinylchloride 2023, contact resistance reduction 2821
Reverberation
Architectural acoustics 534.844
h.f. sound problems 1612
Reversibility 530.162
probability and reversibility 351, reversible motion in liquids and gases 352
Rheology 539.501
chart 265, frictional phenomena 759, classification of properties 1517, plastic flow and elect. resistance 1518, apparatus 1733, thermoplastic polymers 1734, pigment-vehicle suspensions 1735, polyvinyl-chloride 2023, fuller's earth 2226. penetrometer 2227, viscose rayon 2228, glass flow, 2388, elastic and plastic deformation 2406, elasticity anomalies 2594, firmness of soft bodies 2878, theory of rubber 2879, rayon yarns 2880
Rolling
Deformation 539.387
curl of paper 1187
Rotation
Kinematics 531.15
ultracentrifuge equation 989, effect on radioactive decay 1155
Optical 535.56
Drude equation 142, cinchona alkaloids 143, crystalline $NiSO_4$ 654, 655, trihydroxystearic acids 1075, effect of isotopes 1242, α- and β-pinene 1350, methylphenylcarbinol 1431, inversion of methane with trichloroacetic acid 1432, amino acids and formaldehyde 1740, dep. on chem. constitution 1944, 2-halogenopentanes 2784
Salts 541.48
salting action 2435
Scales
Musical 534.321.3
keyboard problem 2538, 2738, tuning 2739
Scattering *see also* X-rays
Electrons 537.533.74
by atomic nuclei 704, fast electrons from B^{11} 705, fast electrons on F and N 706, polarization 1125, 1127, oblique incidence 1126, small-angle, by Al 1969, fast electrons 2831
Light 535.43
polarization 132, interferometer study 133, alcohols 134, viscous liquids 135, hypersonic velocities 136, polarization data 137, thermodynamic theory 138, interferometer study 139, sea and sky 1070, axially oriented molecules 1072, silver sols 1426, liq. surfaces 1427, single cystals 1657, lubricants 1658
Protons 537.534.74
protons by protons 198, rigorous formula 404, by Mg nuclei 1129, inelastic 1697
Seismographs 534.647
transient behaviour 368, lim. sensitivity 369
Solidification 536.421.4
isomeric phenylphenols and pyridine 1098, nomogram for fatty acids 1562
Sols 541.182.6
mineral membranes 294, magneto-optical anisotropy 775, Ag exchange with AgBr suspensions 927, clays as electrolytes 1542, gold sol 1543, electron diffr.

Sols—*contd.*
examination 1544, ageing and coprecipitation 2257, Ag formation 2618, mutual coagulation 2909

Solubility 532.73
solubilization by detergents 82, isomeric paraffin 317, silver acetate 318, 319, mercuric oxide in HCl 1033, rel. to permittivity 1034, $NaNo_3$-dioxane-water 1035, Na_2CrO_4-$NaClO_3$ 1372, solubility effect in benzene 1373, sulphanilamide isomers 1374, Ca oxalate 1375, 1376, isomeric ketones 1457, rate of solution of Mg 1530, γ-globulin 1687, Ni in tungstate solutions 1896, H in Fe, Ni and steels 2310, complex ions 2311, NH_4Br in alcohol 2312, $AgNO_3$-H_2O 2719, thallous salts 2720

Solutions *see also* Latent heat
  Physical properties 532.77
  volume change 83, rubber 84, 1377, dipole swarms 363, viscosity 1036, 1881, 1882, 2149, v.p. equations 1037, surf. tension 1360, KCl-NaCl 1446, reaction kinetics 1528, thermodynamics 1534, CCl_4-$HC_2H_3O_2$-C_6H_6 1601, KI in SO_2 1602, ultrasonic velocities 1609, viscosity/conc. of starch amyloses 1880, microcalorimetry 1897, thermodynamic theory 1898, molar polarizations 2159, palmitic and aleuritic acid 2382, refr. index 2547

Sound films 534.862
trunk-delay announcing 625, projectors 2167, sibilant-sound elimination 2168

Sound-recording 534.862
needle armature pick-up 1909, record-reproducing 1910, record tracking 2749

Sparks
  Electric 537.52
  electroneg. gases 185, impulse 186

Specific heat 536.63
Mn_3O_4, $MnSiO_3$ and Mn_3C 162, manganese 163, Rochelle salt series 164, ammonium chloride 165, equation for CO_2, CO, steam, H, O 387, pure iron at low temp. 868, mol. lattices 869, heat-capacity equations 1107, nomogram for $CaCl_2$ 1299, anhydrous sulphates 1453, ethane and propane 1454, *n*-butane and isobutane 1455, resonance method 1456, Mg_2SiO_4 and $MgSiO_2$ 1670, Mn_3C and MnO_2 2188, hydrocarbons 2355, $CaCl_2$, $FeCl_2$, $MgCl_2$ and $MnCl_2$ 2567, low-temp. 2809, CF_4 by ultrasonics 2810

Spectacles 535.83
perspex 2559

Spectra *see also under* Astronomy; Raman effect; X-rays
  Absorption 535.34
  effect of polarized light 110, nickel compounds 111, crystal violet 112, diamond 113, gluconpremitriles 191, potassium hydrogen fluoride 641, carboxylic acids, esters and salts 642, pyrethrins 643, phenylalanine and tyrosine 644, furan 645, methyl iodide 646, porphines 850, methyl alcohols 851, SO 1405, 1406, aromatic Schiff's bases 1407, protein 1408, double salts 1409, dyes 1410, 1644, crystals and solutions 1639, Lyman series 1640, benzene and derivatives 1641, dienes 1642, Wurster's salts 1643, polymethine dyes 1645, environment and spectra 1646, substituted benzenes 1647, ethylene, butadiene and alkyl derivatives 1648, absorption tube 1649, gas detection and titration 1650, protein solutions 1937, Hg halides 2327, cyclohexane 2328, pyridine vapour 2549, trideuteronitromethane 2772, cyclobutane 2773, *m*-substituted phenols 2774
  Band 535.338.4
  boron monoxide 105, convergence in C_2 106, manganese hydride 107, CO_2^+ 378, 1634, flames 637, polyatomic molecules 638, nitrogen 847, electron transfer 1633, CO, Rydberg series 1635, SnSe 2322, SiO^+ 2323, spin doubling in CO^+ 2324, Hg halides 2327, CCl_4 2765, formic acid 2766
  Emission 535.33
  rare gases 104, line-pair intensity ratio 377, tensor theory 634, Cu arc lines 635, SI iso-electronic sequence 636, steelworks applications 843, mineral powders 844, Cu-Ni impurities 845, Bi I 846, benzole derivatives 1051, transitions in Tl 1054, isotope shifts in N 1055, propyl and butyl chloride isobutylene and propane 1403, butane-1 1477, std. wavelength 1588, stainless steel 1629, synthetic rubber 1631, rare earth 1632, Carnegie Inst. rep. 1931, neutral WI 1932, Gd lines 2171, Hg afterglow 2763, Fe lines as stds. 2764, active N_2 2780, det. of *h*/*e* 2830
  Radio-active radiations 539.163.2
  β-rays; As, Rb and Kr 417, radioactive Co^{56} 733, antimony 896, tracer studies 1159–1164, tracers 1165, γ-rays from As^{76} 1717, electrostatic β-ray spectrograph 2851
  Rotation-vibration 535.338.42
  dissociation of CO 108, ethane 109, phosphorus 639, water vapour 640, triatomic oxides 1636, 1637, benzene 1638, *l*-type doubling 1712, isotropic water molecules 1933, high multiplicity terms 1934, nitric and deuteronitric acids 1935, complex spectra 2172, polyatomic molecules 2175, benzene and methyl derivatives 2191, dichlorobenzenes 2325, HgF 2548, theory 2767, perturbations in CN bands 2768, nuclear spin of Cl^{37} 2769

Spectrophotometry 535.243
hydrocarbon analysis 837, applications 1394, Cenco spectrophotometer modification 1919, low-absorptive glasses 1920, 1921, 2755, wavelength calibration 2319, 6-colour photometry 2682, microphotometer 2754

Spectroscopes 535.33.071
operation technique 1053, steelworks analysis 2170

Spectroscopy 535.33
corrections 100, h.v. arc 101, organic molecules 376, precision 632, curvature of spectral lines 652, radiation from Ni targets 698, line breadth and cold work 699, 2198, fast changing spectra 842, Bi I 846, glow discharge 1051, electrode holder 1052, preparation of compounds 1400, arc intensities 1401, arc ignition 1402, Chicago Conference 1626, use of powders 1627, open arc 1628, pellet electrode 1630, Carnegie Inst. rep. 1927, light-source errors 1928, source unit 1929, carbon arc in O_2 1930, plate calibration 2321, briquetting press 2762

Stability
  Floating bodies 532.32
  balance of heeled ships 599
  Fluid motion 532.5
  instability near a wall 1885

Statics 531.2
dynamical magnitudes 1584, linear problems 2515, bending of surface 2695

Statistical mechanics 531.19
change of state 50, partition function and fugacity 586, equilibrium $2SO \rightleftarrows \frac{1}{2}S_2+SO_2$ 1406, condensation 1582, binary mixtures 1583, fundamental concepts 1868, binary system 2297, 2298, partition function, liquids 2813

Stereochemistry 541.63
general survey 437, rubber 438, rubber molecule 439, catalytic hydrogenation 770, isotopes and optical rotation 1242, structure of $AlCl_3$ and SO_2 compounds 1423, K-tetra-oxalato-U IV 1795, co-ordination nbr. 8 2058, diene reaction 2624

Stereoscopy
  Optics 535.767
  subjective space 151, 380, stereo-movies 665

Steric hindrance 541.636
BF etherates 1243, allyl esters 1244, *n*-butane and isobutane 1455

Strength *see also* Elasticity; Tensile strength
  Mechanical 539.4
  rubber elasticity 260, synthetic polymers 261, phenoplastics 262, use of fixed cartridge cases 263, temp. effect on phenolics 427, internal friction and cold-work 699, 2198, notching of strained metals 913, rate of loading 914, perforated plates in columns 1189, annealing of glass 1190, effect of test treatment 1194, living matter 1359, carbon black in rubber 1512, aluminium alloys 1513, effect of grain size 1514, steel plate 1515, effect of vulcanization 1529, rolled annealed Al 2007, X-ray evidence 2008, polymeric materials 2019, Sb-Sn-Cd alloys 2225, plastic mouldings 2398, thermal endurance of glass 2399, cold stretching thick cylinders 2400, plastics 2401, 2867, Plexiglas 2868, properties of laminates 2869, notching 2870, stress concentrations 2871, low-temp. effects 2872, brass strip 2935

Stresses
  Elasticity 539.3/.4
    isostatics 1183, electronic in 2395, expanded tube joints 2590, tube expanding 2591
  Latent 539.319.2
    thermal stress 255, annealed glass containers 656, rubber 870, photo-electric analysis 1073, welding 2394, oxyacetylene cutting 2865
  Statics 531.22
    inf. strip, isolated couple 354, matrix analysis 587, extensible cable 803, loaded membrane 2106, aeolotropic media 2516, allotropic bodies 2696
Stroboscopy 534.415
    vibrometer 1040
Sublimation 542.49
    apparatus 2925
Supersaturation 532.787
    germ formation 1899
Supra-conductivity 537.312.62
    lead isotopes 183, NbH and NbN 395, Pb films 691, Sn, Cb, Ta and Pb wires 692, magnetic behaviour Sn-Zn alloys 1119, hollow sphere 1469, magnetic moment 1470, unsteady transition 1685
Surface effects
  Optics 535.39
    film thickness 247, electron microscope study 857, reflectivity measurements 2176
Surface tension 532.61
    deformed cell 77, drop-weight method 361, surface-tension/viscosity nomograph 606, micelle-forming solutions 607, dodecylamine acetate 608, temperature effect 609, calculation 610, contact-angle measurement 611, parachors 769, 2056, metal crystals 772, alkyl compounds 814, cellular forms 815, metabolizing cell 816, cell division 817, KCl solutions 1026, aliphatic nitroparaffins 1027, adsorption 1028, boundary lubrication 1029, dropping Hg 1030, rel. to heat of sublimation 1031, living matter 1359, magnesium sulphate 1360, metallic drops 1361, methane-propane 1362, rel. to v.p. 1363, temperature effects 1364, cavitation theory 1365, surface-active agents 1366, ZnO pigments 1598, parachor 1671, Na laurate solutions 1889, optical method 2155, statistical theory 2157, oil/oleic-acid/water 2307, SO_2 addition compounds 2525, brazing alloys 2526, Antonoff's rule 2527, definition 2713, Hg surface pulsations 2714, capillary method 2717
Surface texture 539.211
    diamond dust for cutting 234, metallographic polishing 235, optical measurement 247, electron microscope study 402, 1174, 1175, Amer. std. of finishes 737, replica preparation 738, journal bearings 739, polishing 740, electric tracer 1173, roughness estimation 1892, raised grain in wood 2218, testing of finishes 2387, electron micrographs 2582
Susceptibility
  Magnetic 538.214
    nickel compounds 111, peroxides 714, Mg, Ag, and Li 715, brown ferric phenanthroline 1700, homologous series 2369, ferromagnetic impurities 2370
Swelling 539.388.8
    elastoidin 240, nitrocellular fibres 241, wood 258, wood-water 307, wool felting 910, Hycar OR-15 1510, effect of aniline pt. 1511, cellulose, double refr. 1943, rubber 2018, plywood 2397
Tautomerism 541.623
    nitroparaffins 1794
Telescopes
  Optics 535.83
    Schmidt telescope, theory 1952
Temperature
  Measurement 536.5 *See also* Thermometry
    survey of methods 1451, gas in i.c. engines 1452, instruments 1666, liquid-steel temperature 2353, temperature indicators 2806, gas streams 2807
  Regulation 536.58
    electronic 1103, Hull circuit 2354, portable 2808
Tensile strength 539.42
    cloth-strength testing 915, tensile-shock properties (C steel) 2402
Tension
  Measurement 531.78
    spring tension balance 595, 2703
Thermochemistry 541.11
    nomograph 268, NO_2 in cool flames 673, pyrolysis and bond energy 920, hysteresis phenomenon 1519
Thermodynamics 536.7
    swelling of rubber 84, theory of scattering 138, stretching of rubber 168, barium bromide 169, metal halides 170, solid crystal systems 305, dipole swarms in solutions 363, germanium hydride 388, historical 390, rel. betw. derivatives 678, equilibrium of alloys 1197, theory of galv. cells 1220, rubber solutions 1377, crystal lattices 1460, glycine in dioxane-water 1533, NaCl solutions 1534, cerium amalgam 1536, steam engineering 1673, water and organic liquids 1677, theory of solid systems 1898, properties of the liquid state 1957, structure of solids 1997, viscosity of sulphur 2150, benzene and methyl derivatives 2191, corrosion 2192, KBr 2248, $CaCl_2$, $FeCl_2$, $MgCl_2$ and $MnCl_2$, 2567, photon statistics 2750, partition function, liquids 2813, ageing of Cu-Al 2814
Thermoelectricity 537.32
    pure iron 1121, kinetic interpretation 2824
Thermometry 536.5
    infra-red radiation 161, testing baths 1667, Sunvic recorder 1668, photo-electric 2566, hot-wire 2805
Thermopiles 536.53
    calibration of Pt/Rh-Pt couple 676, calibration 1104, plug-in head 2186
Thermostats 536.581
    control of gravimeters 345, bath 2187
Thixotropy 541.18.025
    rev. syneresis 1228, pigment-vehicle suspensions 1735, time coefficient 2617, oils 2906
Time
  Measurement
    Physics 531.76
    high-speed cine camera 2145, electronic time meter 2701
Tone analysis 534.41
    clarionet tone quality 1907, audio analyser 2743
Tone synthesis 534.42
    electrical musical instruments 832
Torque
  Measurement 531.785
    friction torque 1874
Torsion
  Elasticity 539.385
    comb. with compression 2592
  Statics 531.225
    Saint-Venant's problem 804, fluted column 1332, relaxation method 1869
Transformations
  Isothermal 536.712
    empirical equation 171, second virial coeff. 1462
Transparency 535.345
    quartz glass 1057, transmission and contrast 1916
Turbidity 535.434
    optical measurement 653, ultracentrifuge 1071, precip. of AgCl 1540, microdensitometer 1622, theory 2331, water-in-oil 2332, changes during setting 2552, randomly distributed particles 2782
Turbulence
  Hydrodynamics 532.517.4
    Reynolds' number and velocity distribution 1886, vortices 2154
Ultracentrifuge 541.18.043
    operating conditions 303, improved cell 945, conference on ultracentrifuge 1229, 1230, high centrifugal fields 1231, pollens causing hay-fever 1472
Ultramicroscope 535.822.4
    latex, motion picture 1539
Ultrasonics 534.321.9
    effect on X-ray diffraction 90, 91, hypersonic velocities 136, effect on magnetism 716, generator 1605, liquid mixtures 1609, propagation in wires 2537, metallurgical application 2539, vel. in electrolytes 2735, CO_2 and H_2O at 98°C 2741, CO_2 at 0–100°C. 2742, sp. ht. of CF_4 2810
Units
  Electrical 537.71
    standards 1132, permeability values 1133, def. of *B* and *H* 1134
Vacuum meters 531.788
    apiezon oil gauge 1343

Vacuum pumps 533.5
tire valve 822, vacuum regulator 823, use of Wood's metal 2690

Valency 541.5
modern conception 313, pyrolysis and bond energy 920, valence bond theory 948, covalent binding 949, rel. to ht. of combustion 1111, quantization of diatomic mols. 1984

Vaporization 536.422/.423
NH_4Cl 2562

Vapour pressure 536.42
nomograph 157, v.p.-lat. ht. relation 166, liquid N_2^{14} and N_2^{15} 866, solutions 1037, N_2^{14} and N_2^{15}, NH_3 and ND_3 1100, v.p. and electrodynamic vol. 1101, rel. to surf. tension 1363, KCl-NaCl 1446, NaCl sol. 1447, phenylhydrazine 1448, phenothiazine 1449

Velocity

Measurement 531.76/77
stroboscopic patterns 1591, stroboscopes 1873

Sound 534.22
rel. to viscosity 89, bond property 831, alcohols 1387, resonator method 1607, CO_2 2741, 2742

Vibrations 534
rods 87, torsiograph 88, Laplace transformation 792, helical spring 824, vertical cantilever 825, continuous beams 826, helical gear 827, electrical machinery 828, demonstration oscillator 830, reciprocating-engine shafts 1382, force const., α-quartz 1383, Goodyear vibrator 1384, electrical measurement 1385, cellular pulsations 1604, vibration meters 1610, vibration motors 1610, engine torque curves 1903, pump rods 1904, suspension bridges 1905, steam turbines 1906, transient analysis 2163, capacitance pick-up device 2165, equiv. electrical circuit 2533, vibrating table 2535, measurement of elastic moduli 2589, frequency-controlled 2732, rotating shafts 2733, electronic apparatus 2734

Viscosity

Gases 533.16
friction and damping 86, Co, He, Ne and A 1038, viscosity/temp. equation 2314, nitrogen 2532, b.p. and viscosity 2722

Liquids 532.13
decahydronaphthalene 62, hydrocarbons 63, crystalline liquids 64, viscosity-temperature relation 65, cellulose structure 66, high-speed rotational 67, improved capillary type 68, capillary pipette type 69, bubble tube 70, rotation of cylinders 71, friction and damping 86, sound velocity and viscosity 89, bituminous substances 178, amino acid polypeptides 179, rubber 245, isomeric paraffins 317, emulsions 359, paraffin oil emulsions 360, polyisobutylene 598, surface-tension/viscosity nomograph 606, solutions of long-chain mol. 1022, pure liquids 1023, polyester solutions 1036, nomogram for $CaCl_2$ 1299, glass 1344, nylon solutions 1345, viscosity/conc. of cellulose 1346, temperature function 1347, rotating-cylinder 1348, fluidity funnel 1349, living matter 1359, mol. wt. of chain polymers 1547, polyisobutylenes 1594, heat bodying of tung oil 1595, h.p. capillary-flow 1596, water and organic liquids 1677, viscosity const. 1878, petroleum 1879, amylose comp. of steel 1880, concentrated solutions 1881, 1882, rolling-ball 1883, history 1884, pitch 2146, coal-tar residues 2147, sulphur 2148, 2150, solutions of long-chain molecules 2149, spherical imprint 2151, penetrometer 2227, fluidity of mixtures 2301, paint-consistency measurement 2302, viscosity temp. equilibrium 2314, capillary-tube method 2520, temperature relation 2521, non-ideal systems 2522, SO_2 addition compounds 2525, methane-propane 2707, rheochor 2708

Vision 535.7
darkness adaptation 663, 1946, war-time and black-out 1083, perception and aesthetics 1438, std. response curves 1618, low-brightness 1947, industrial vision 1948, sensory energy 1949, visual purple 2181, low-brightness levels 2182, observations in infra-red 2341, resolution limit 2342, Thomas Young oration 2790, peripheral acuity 2791, foveal adaptation 2792

Vitreous state 539.213
basic principles 741, glass flow 2388, cords in glass 2855

Volume

Measurement 531.73
respirometer 56, film volume 358, hydrostatic gauges 808, solidified water films 1020, soap-bubble method 1337, volumeters for hydrocarbons 2518, CO_2 method 2699

Wave mechanics 530.145.6
meson waves 334, field theory 681, Bose–Einstein condensation 1901, meson equation 2143, fundamental equation 2693

Waves

Electromagnetic 538.56
electromagnetic-hydrodynamic waves 76, refr. indices of gases 1485, coastal refraction 1980, reflection from parabolic layer 1981, cavity resonators 2208, 2373, oscillations made visible 2372, cyl. cavity 2374, downcoming angle of arrival 2375, reciprocity 2376, aq. solutions 2577, magnetized medium 2578, wave guides 2841

Hydrodynamics 532.59
electromagnetic-hydrodynamic waves 76, water movement 605, pulsations in conduits 813, sand-transporting 1358, turbulence 2304, rel. to wind 2953

Sound 534
explosion 365, propagation in atmosphere 621, solid cylinders 1386, reflection in continuously varying media 1608, ultrasonics in wires 2537, superposition, gas waves 2540, ultrasonics in solutions 2735

Weirs

Hydrodynamics 532.53
pressure distribution 1341

Wetting 532.696.1
solubilization by detergents 82, paper surface 362, metal cleaning 613, free-energy changes 1108, flotation kinetics 1367, pigment dispersion 1599

Work

Measurement 531.78
propeller agitators 2702

X-ray examination 539.26 *See also* Crystals
metallographic polishing 235, organic compounds 248, applications 249, technique and applications 250, technique 251, camera 252, spinning process 253, SiO 254, Ross filter foils 425, industrial 426, data index 749, liquid oxygen 750, cellulose fibres 751, crystal photography 904, Cb filter 905, coal 1109, β-lactoglobulin 1178, particle size by X-ray diffraction 1179, linear polyamides 1180, equilibrium diagram 1181, cold-work in metals 1504, rubber curing 1505, specimen preparation 1506, ceramics 1507, wool fibre 1508, Na stearate 2006, rolled annealed Al 2007, cold-worked metals 2008, Co transformation 2009, crystallography apparatus 2010, liq. CCl_4 2011, 2864, storage-battery pastes 2030, fibrinogen 2220, tension compression device 2393, linear polymers 2585, α-keratin 2586, mercury 2587, xenon 2588

X-rays 537.531
radiation from tellurium 188, 697, X-ray satellites 189, heavy elements 190, radiation from Ni targets 698, laboratory experiments 700, effect on chromosomes 1476, photo-elect. eff. of metals 1616, chem. action 1692, effect on broad bean root 1693, haemoglobin analysis 2200, satellite groups 2828

Absorption 537.531 : 535.34
gluconitriles 191, absorption 2364

Diffraction 537.531 : 535.4
effect of ultrasonics 90, 91, diffraction theory 399, A in liq., vap., and crit. regions 400, liquid elements 2199, measurement 2362, 2757

Reflection 537.531 : 535.31
reflection from crystals 879, reflection from $AuCu_3$ 2363

Scattering 537.531 : 535.36
temperature variation 398, thermal scattering 2197, measurements with 500 kV tube 2362

Secondary radiations 537.531.8
aq. solutions 1475, single metal filters 701, range 1694, ion clusters 2201

Spectra 537.531 : 535.33
satellites 189, heavy elements 190, line breadth and cold work 699, 2198, abs. wave-lengths 1474, wave-length notation 1690, mass coefficients 1691, rotary focalization 2829, det. of *h/e* 2830

Yield point 539.389.1
mild steel 911, metals beyond the y.p. 1188

46
43

GEOPHYSICS

- **Atmosphere**
  - **Dust** 551.510.42
    - rel. to conductivity 1282, rel. to atm. electricity 2095
  - **Optics** 551.593
    - spectrophotometric observations 505, Wrexham observations 506, halo complex 507, ultra-violet spectrum 1277, night sky brightness 1278, photometry 1279, light of night sky 1280, illumination 1552, night sky 2685, theory 2961
  - **Structure** 551.51
    - thunderstorms recording 1819, chemistry of atmosphere 1820, Swiss power-plant service 2090, glacial anticyclones 2456
  - **Thermodynamics** 551.511
    - subsidence and ascent of air 484, acceleration potential 2092
- **Aurora** 551.594.5
  - Alfvén's theory 471 height 505, Montreal 18 Sept., 41 513, 18/19 Sept. 1941 977, light of night sky 1280, radio location 1821, solar origin 2098
- **Charts**
  - **Magnetic** 550.389
    - reduction to epoch 466, April '42–March '43 474, 1264, 2076, 2633, isoporic charts 777
- **Climatology** 551.58
  - W. Indies 504, orbit variations and climate 975, Guatemala weather type 2094, reactions of human body 2458, prune crop yields 2643, long-period variations, 2674, soil phenomena as evidence 2944, precip. effectiveness 2956, effects on cable insulation 2958, Mediterranean 2959, influence of ocean 2960
- **Clouds** 551.576
  - condensation 2803
- **Dew** 551.574.4
  - Kew data 497, persistence 2954
- **Disturbances**
  - **Atmospheric** 551.515
    - Middle Atlantic Coast 485, atmospherics during monsoon 2265
  - **Magnetic** 550.386
    - rel. to solar and ionosphere disturbances 998
- **Dust storms** 551.515.3
  - frequency in Egypt 486
- **Electricity**
  - **Atmospheric** 551.594
    - correlation with solar eruptions 322, geomagnetic bays 467, res. of vertical air column 508, abrupt field changes 976, latitude effect 1281, rel. to pollution 1282, sep. of electricity in clouds 1283, 2097, effect of smoke 2095
  - **Terrestrial** 550.37
    - measurement 970, electrical properties of soil 1679, earth static 1813, conductivity measurements 2938
- **Erosion** 551.3.053
  - sand-transporting 1358, rel. to water pollution 2942, glacial anticyclone 2943, evidence of climatic change 2944
- **Evaporation** 551.573
  - drops and spherical surfaces 496, theory 2530, free-liquid surfaces 2531
- **Fog** 551.575
  - association of ions 1275, seeing through fog 1276
- **Geochemistry** 550.4
  - radioactive marine rocks 475, geochemical U/Pb ratio 895, He and radioactivity in rocks 971, caesium 1158, radioactivity 1715, radioactivity and He in rocks 2212, radioactive distribution 2384
- **Geology** 551
  - effects of structure on radio reception 2638
  - **Applied** 550.8
    - interpretation methods 1814
- **Geophysics** 550.3
  - appl. to petroleum industry 1810, Carnegie Instn. Rep. 2065, cooling planet 2114, forecasting 2936
- **Glaciers** 551.311.12
  - buried ice 1265, glacier fluctuation 1272, glacial anticyclone 2456
- **Gravity**
  - **Geophysics** 550.312
    - surface-gravity profile 461, mathematical analysis 1811, calculations 2066
- **Hail** 551.578.7
  - Kent 1943 2957
- **Humidity**
  - **Atmospheric** 551.571
    - dew-point determination 492, det. by evaporation 493, exceptionally dry air 494, abnormally dry air 495, measurements in presence of salts 2317
- **Instruments**
  - **Meteorological** 551.508
    - history 482, dew-point determination 2455, recent developments 2724, correction formula 2725, spectroscopic 2948
- **Ionosphere** 551.510.535
  - reflection from ionized layer 320, night sky and ionosphere 483, ionospheric observatory 778, rel. to solar and magnetic disturbances 998, electron density distribution 1268, effect on radio 2091, structure 2949
- **Lightning** 551.594.22
  - phenomena 509, effect on thin metal surfaces 510, field fluctuation 511, 512, magnetic links 1553, current intensity 2096, striking frequencies at diff. ht. 2270, lightning analysis 2963
- **Magnetism**
  - **Terrestrial** 550.38
    - Carnegie Instn. Rep. 1255, 2072, derivatives of fields 1707, calculations 2066, Huancayo monthly means 2071
- **Meteorology** 551.5
  - eclipse meteorology 480, internat. bibliographies 2089, soaring flight 2263, interpolation tables 2453, R.A.F. 2945, Symons Mem. Lect. 2946
- **Moisture**
  - **Soil** 551.599
    - shrinkage of black cotton soil 503
- **Observations**
  - **Meteorological** 551.506
    - capillary mercurial 481, phenological report 1942 974, cold winters at Kew 1267, 2264, Greenwich (1942) 2454, U.S. Weather Bureau 2639, Camden Sq. obs. 2947
- **Observatories**
  - **Magnetic** 550.381
    - Sitka 1257, Oslo observations 1843–86 2073, list of observatories 2630
- **Oceanography** 551.46
  - organic derivatives 479, Gulf Stream variations 1266, Humboldt Current 2262, salinity variations (Irish Sea) 2452
- **Pressure**
  - **Atmospheric** 551.543
    - sunspot lat. correlation 2093, sunspot influence 2641, effect of cosmic rays 2835
- **Prospecting** 550.8
  - Crosbyton anomaly 476
  - **Electrical** 550.837
    - attenuation in earth 1817, impedance of earthed wire 1818, effect of mud resistivities 2086, Monument oil field 2087, well-logging 2636, surface of discontinuity 2637, collinear earthed wires 2940, study of anisotropic folds 2941
  - **Gravimetric** 550.831
    - oil exploration 972, integrator 1815, magnetite outcrop 2077, Bouguer correction const. 2078, tidal corrections 2079, interpretation of data 2080, Hatchetigbee Anticline 2081
  - **Seismic** 550.834
    - reflection-seismograph methods 973, weathering corrections 1816, S. Mississippi salt dome 2082, velocity distr. (Texas) 2083, bauxite 2084, abnormal reflections 2085, multiple branches 2634, strike and dip formulae 2635, secondary arrivals 2937, computation methods 2939
  - **Magnetic** 550.838
    - well-core orientation 477, magnetite outcrop 2077
- **Radiation** 551.521
  - intensity variations 321, obs. betw. N. York and Valparaiso 408, heat transfer by infra-red 487, refl. and absorption in fog 1269, Committee rep. (cosmic rays) 1270, Washington records 2457, variations 2951
- **Rainfall** 551.577
  - Madras and Bangalore 498, excessive falls 499, 2269, precipitation maps, U.S. 2268, British Isles 1930–39 2955, precip. effectiveness 2956, Kent 1943, 2957
- **Sedimentation** 551.3.051
  - thickness measurement 478

Seismology 550.34
Satpura earthquake 462, ray-path/wave-front charts 463, velocity/depth equation 464, pulses not of min. travel time 968, earthquake effects 969, bibliography 1256, reflected refractions 1812, Carnegie Instn. Rep. 2067, seismic-path calculation 2068, magnitude, energy, acceleration 2069, dynamic force on buildings 2070, deep-focus earthquakes 2629, secondary arrivals 2937
Snow 551.578.4
hail and snow pellets 500, shielded gauges 501, East Kent data 502, plastic snow tube 2642
Storms
Magnetic 550.385
27-day recurrence 469, data 41–42–43 470, 776, 1261, 2075, 2632, Alfvén's theory 471, Copenhagen March 42 472, Gjöahavn observations 473, Cape Town 1262, sudden-commencement (1941) 1263, rel. to corona intensity 1320, Dombås data 2451
Tectonics 551.24
mountain-building theory 2088
Temperature
Atmospheric 551.524
Kilmarnock statistics 488, 1273, Mt. Washington 469, cold winters at Kew 1267, 2264, U.S. maps 1271, glacier fluctuation 1272, days with min. < 32°F 2266
Earth 551.525
daily and seasonal changes 1274, Camden Sq. 2952
Thunderstorms 551.515.4
vertical velocities 2640, kalbaishakhis 2950, structure 2962
Variations
Magnetic 550.384
Mt. Wilson data, April 1942–March 1943 465, 1258, 2074, 2631, reduction to epoch 466, geomagnetic bays 467, pulsations at Hermanus 468, det. of field in geological epochs 1259, lunar geomagn. tide 1260
Visibility 551.591
seeing through fog 1276, rel. to conductivity 1282
Wind 551.55
Atlantic winter storms 490, Caribbean trade winds 491, New England observations 2267, veer of wind 2953

VARIOUS SUBJECTS

Air pollution 614.7
rel. of soil conservation 2942, Roy. Instn. lecture 2964
Alloys
Aluminium 669.7
Mg and Al alloys 912, working stresses 1513, Hall effect 1705, structure 2007, soldering 2526, Al-Zn 2599
Antimony 669.75
photo-electric properties 1043
Copper 669.3
beryllium-copper 978
General 669.018
magnetic and dilatometric changes 203, equilibrium at low temp. 1197, Mg-Mn-Zn-Al 2160
Gold 669.21
alkali alloys 2645
Nickel 669.24
diffusion of air 1603
Tin 669.6
effect of grain size on strength 1514, heat-treatment effects 2225
Anatomy 611
sensory energy 1949
Architecture
Educational buildings 727
Northwestern Univ. Lab. 2689
Aviation 358.4
meteorology 2945
Bacteriology 576.8
correlation of rate data 2287
Bibliography 016
meteorology 2089
Biological experiments 578
osmotic pressure 819
Biophysics 577.3
effect of neutrons 420
Blood 591.11
structure by absorption 1408, X-ray analysis 2200, 2220, haemoglobinometer 2554, *p*H 2613, colour 2789
Blood transfusion 615.38
blood plasma filter 771
Botany 581
effect of fluorescence 854, chromatography of leaf pigments 1436, mathematical approach 1555, 2280, form of plants and animals 2281, general variational principle 2290, elect. correlates of strains of sweet corn 2356
Brass 669.35
use of fired cartridge cases 263, effect of welding 2935, gaseous impurities 2965
Calculating machines 681.14
Fourier-series summation 8
Cellulose 661.713
isotropic cellulose 389, X-ray examination 751, infl. of manufacture on fibre 2003
Ceramics 666.3/.7
X-ray investigation 1507, refractory materials 1823
Cobalt 669.25
X-ray transformation study 2009
Concrete 666.97
concrete at high altitude 675
Cytology 576.3
electric potential 172, cellular forms 815, metabolizing cell 816, cell division 817, radioactive tracers 1165, physical properties 1359, effect of X-rays and neutrons 1476, cellular pulsations 1604, cell division 2306
Dyeing 667.2
chemiluminescence 1067, ultra-violet absorption 2771
Enzymes 577.15
selective irradiation 1613, mitogenetic radiation 2459
Field crops 638
effect of α-rays 418, effect of X-rays 1693
Fruit-growing 634.1/.7
effect of weather 2643
Glass 666.1/.2
fluorescence 117, thermal endurance 514, physical properties 578, annealing stress 656, polishing 740, cordiness testing 748, mechanical properties 752, viscosity 1344, anomalous flow 2388, thermal endurance 2399, cords 2855
Gliding 797.5
soaring flight 2263
Heat treatment 621.78
hardness of alloys 266
Histology
Biology 576.72
oxygen in blood 1597
Zoology 591.8
h.f. absorption 1117
Industrial chemistry 66
appl. of physics 2686, 2688, propeller agitators 2702
Ink 667.4/.5
colour correction 2778
Insects 595.7
electron-microscope study 857
Instrument-making 681
interferometer 1424, clarionet tone quality 1907, synchrophone 2099
Iron 669.13
fluidity of cast iron 1357
Leather 675
density 2700
Logic 16
stratified systems 980
Metallurgy 669
metal cleaning 613, electron microscope examination 1175, equilibrium diagrams 1181, sintering 1200, 2031, flotation kinetics 1367, ultrasonic waves 2539
Mineralogy 553
quartz crystals 779, permittivity of bitumen 1963, Canadian mica 2644
Movement
Animal 591.17
flight problems 619, fish 1822
Music 78
pressure variation in flute 2164, piano strings 2737, tuning 2739

Nervous system 591.18
electron-optic examination 2271, electrical responses from acoustic centre 2460
Painting 75
Colour Council symposium 858
Paints 667.62
physical properties 578, pigments in dispersed system 659, pigment preparation 766
Palaeogeography 551.8
earth's magnetic field 1259
Paper 676
paper surface 362, photochemical stability 1225, beater practice 2004, paper micrometer 2299, moisture control 2442, flow of printing-ink 2859, liquid permeability 2860
Pathology 616
epidemic curve 534, 1305, pollens causing hay-fever 1472, properties of dental materials 2512
Pest control 632
phenothiazine 1449
Petroleum 622.323
appl. of geology 1810
Petrology 552
magnetization 1701
Photography 77
characteristics of silver bromide 298, lens adjustment 630, high-speed camera 780, *D*/log *E* characteristics 838, nuclear disintegration recording 897, graininess 900, reflex plate 979, electron action 1128, photographic emulsions 1176, recording macrostructures 1439, micrography 1440, rectification of photographs 1623, latent image formation 1774, solarization 1775, view finder 2100, high-speed oscillography 2101, perspective drawing 2104, time base for high-speed camera 2145, properties of mercury vapour lamps 2274, contact-printing densitometry 2275, sensitivity and grain size 2276, autoxidation of hydroquinone 2277, document-copying camera 2278, applications 2279, appl. in nuclear physics 2386, print graininess 2391, silver halides by dyes 2428, fog removal 2461, development, catalysis 2611, plate calibration 2764, colour correction 2778, oxidation 2896, latent image 2905, 2966, appl. in drawing office 2967, densities 2968
Physiology 612
oximeter 658, the eye 662, dark-adaptation 663, radioactive tracers 1165, fish 1822, blood plasma 2272, inspiration measurement 2313, theory of hearing 2541, oscillations of the ear 2746, threshold audiogram 2747, foveal adaptation 2792
Plastics 679.5
heat conductivity 382, temp. effect on phenolics 427, abrasion resistance testing 428, gloss lowering 429, vinyl elastomers 742, plastel 756, self-recording 899, 1998, water absorption 903, methyl vinyl ketone 953,
Plastics—*contd.*
mech. prop. of cellulose acetate 1177, nylon 1580, plasticized polyvinyl chloride 2022, effect of softeners 2023, vinyl elastomers 2222, burning rate 2352, structure and strength 2398, vinylidene chloride 2440, optical materials 2558, spectacle lenses 2559, plastic snow tube 2642, stress birefringence 2783, effect of fillers on strength 2867, strength of Plexiglas 2868
Plywood 674.04
wood and plywood 755, raised grain in wood 2218, phys. properties 2221, swelling and moisture 2397
Radiotherapy 615.84
neutron treatment 1498
Respiration 591.12
respirometer 56, micro-electrodes for oxygen tension 938
Rubber 678
structure and reactions 515, density measurement 594, microscopy 666, equation of state 870, thermodyn. theory of solutions 1377, vibration properties 1384, synthetic rubbers 1461, curing process 1505, stretching of rubber 1509, Hycar OR-15 1510, effect of aniline pt. 1511, effect of carbon black 1512, vulcanization 1529, motion picture 1539, high polymers 1548, symposium on chemistry 1554, infrared spectrum 1631, electrophoresis 1688, properties and applications 1861, swelling 2018, brittle temp. 2024, structure 2845, length of molecules 2846, resilience 2882
Soils 631.4 *see also* Capillarity; Granular structure
moisture in sand 818
Standardization 389.6
surface roughness 737, electrical measurements 1132
Statistics 31
Argentine industry 1284
Steel 669.14
spectrograph application 843, 2170, yield point 911, corrosion fatigue 917, F_3C crystal orientation 1249, stress relieving treatment 1515, C-atoms in martensite 1804, steel brittleness 2224, temp. measurement 2353, creep strength 2405, Fe-Sn 2598, Si-Fe 2930
Textiles 677
cellulose structure 66, Tentative Textile Std. No. 7 424, cotton structure 746, permeability 747, fabrics 757, wool felting 910, cloth strength testing 915, viscosity 1345, keratin structure 1501, fibre length 1503, fibre structure 1508, fibre characteristics 1723, sponge-rubber substitute 1824, electrical properties 1959, viscose rayon 2228, quantitative analysis 2519, drying of textiles 2620, rheology 2880
Toxicology 615.9
Harger test 2924
Water-softening 663.632.4
cation exchange 2273
Weapons 623.4
physics 2687

Printed by UNWIN BROTHERS LIMITED, LONDON AND WOKING

46
43